TEMBER 1956
LI NO. 9

VETERINARY Medicine

Established 190

LIBRARY
CURRENT SERIAL RECORD
AUG 30 1956
U. S. DEPARTMENT OF AGRICULTURE

features in this issue...

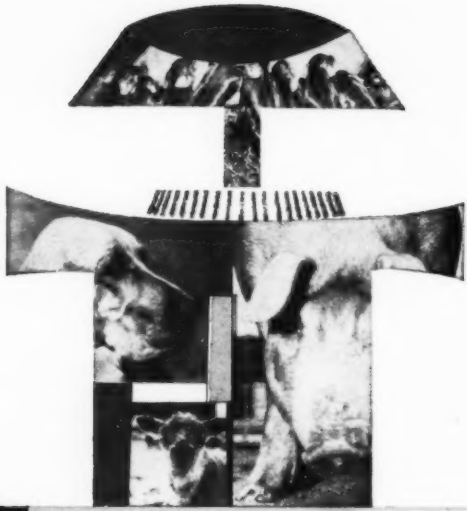
Indiana Veterinary Medical Association Convention Program
Trends In Dairy Cattle Practice
Diagnosis Of Poultry Diseases
New Developments In Swine Nutrition
Practical Laboratory Procedures For The Practitioner
Advances Made In Swine Practice, Part IX: Transmissable Gastroenteritis
Clinical Use Of A New Nitrofuran Dosage Form In The Retained Placenta Syndrome In Cattle
Some Complications Incidental To Swine Production
Some Concepts Of Canine Distemper Immunization
Cats And Unusual Pets

(Complete Index on Page VIII)

ENTERED AS SECOND CLASS MATTER SEPTEMBER 15, 1949, AT THE POST OFFICE AT KANSAS CITY, MO. UNDER THE ACT OF MARCH 3, 1879

Published Monthly
$5.00 PER YEAR
50c PER COPY

SUITE 803, LIVESTOCK EXCHANGE BUILDING, KANSAS CITY 2, MISSOURI, U. S. A.

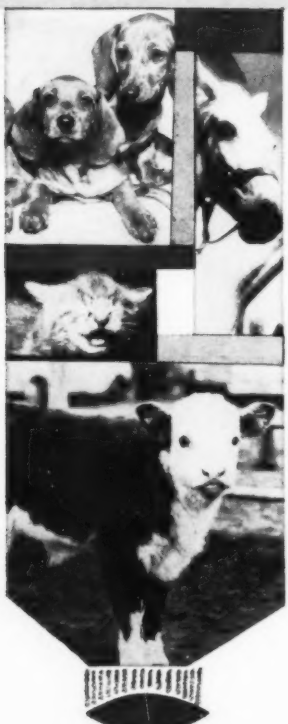


PARENTERIN produces consistent results in four to six hours without cramping, nausea or drastic purgation. Because of its mild action, it is safe for the young, old or debilitated patient. Also valuable in rumen stasis

Jen-Sal

long acting, injectable laxative

priced for routine use

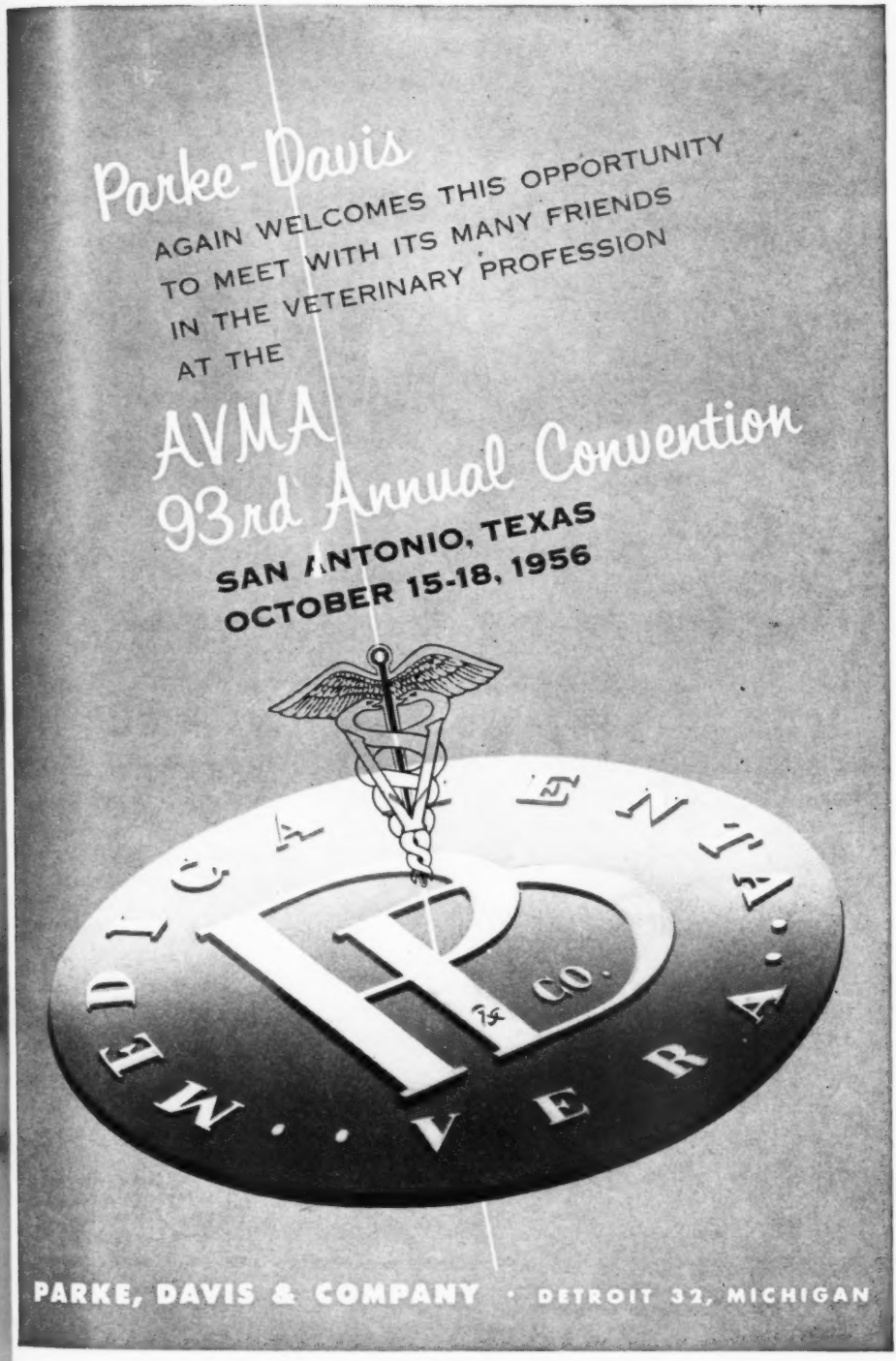


Administer PARENTERIN intramuscularly or subcutaneously. Large animals, 10 to 20 cc.; small animals, 1 cc. per 20 pounds body weight. The recommended dose may be repeated in six to eight hours without danger of toxicity. PARENTERIN contains 20% soluble glycosides of cascara sagrada in aqueous solution. It has proved to be approximately ten times as effective as the official U. S. P. extract of cascara. Supplied in cartons of 6—100 cc. vials

Jensen-Salsbery Laboratories, Inc.
Kansas City, Missouri

PARENTERIN

SE


Parke-Davis
AGAIN WELCOMES THIS OPPORTUNITY
TO MEET WITH ITS MANY FRIENDS
IN THE VETERINARY PROFESSION
AT THE
AVMA
93rd Annual Convention
SAN ANTONIO, TEXAS
OCTOBER 15-18, 1956
MEDICINALS · VETERINARY
PARKE, DAVIS & COMPANY · DETROIT 32, MICHIGAN

A new era in hog cholera control began with

M·L·V*

THE *original* MODIFIED-LIVE-VIRUS VACCINE

On August 9, 1951, the U.S.D.A. issued to Fort Dodge the first license to market a modified-live-virus hog cholera vaccine. The U. S. Patent Office issued a patent on the M·L·V production process (Re-23746). Today, M·L·V is backed by five years of field use and its efficacy has been proved on many millions of swine. Veterinarians around the world employ M·L·V for safety and long-lasting immunity.

FORT DODGE

*Trade mark, Fort Dodge Laboratories, Inc.

The modern all-purpose local anesthetic

CYCLAINE®

(VETERINARY)

HEXYLCAINE HYDROCHLORIDE

'CYCLAINE' is fast-acting, long-lasting, relatively nontoxic; has a wide safety margin—provides sensory anesthesia with little or no motor nerve effect.

Available in 2 concentrations: 1% (infiltration; nerve block; epidural anesthesia in dogs) supplied in 100-cc. rubber-capped bottles. 5% (epidural anesthesia in large animals; topical anesthesia) in 20-cc. rubber-capped vials.

MSD

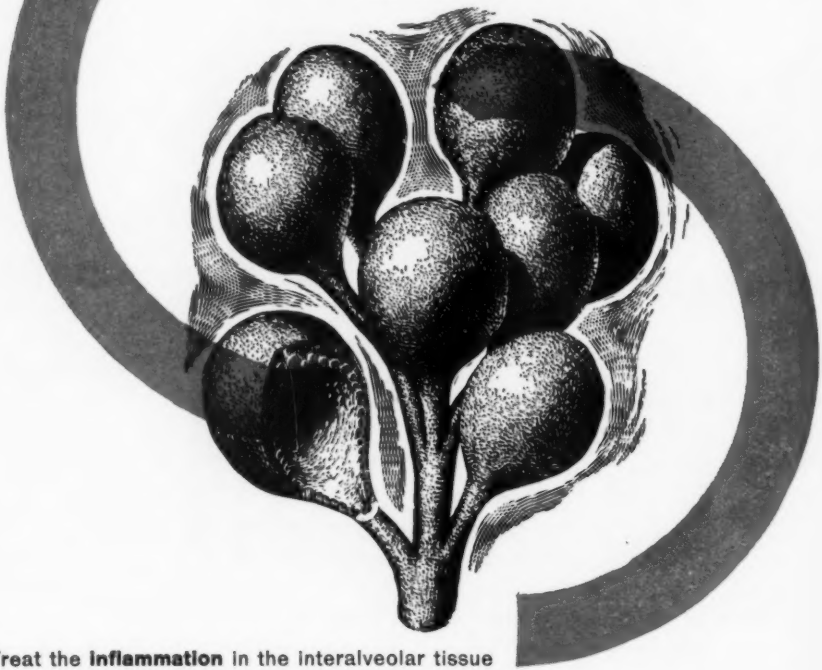
MERCK SHARP & DOHME

DIVISION OF MERCK & CO., INC., PHILADELPHIA 1, PA.

VETERINARY DEPARTMENT, U. S. VETERINARY LICENSE NO. 3.

now . . . treat **BOTH**
the **infection** and **inflammation** of mastitis

Treat the infection in the alveolus
with this synergistic and additive combination of NEOMYCIN, PENICILLIN, *and* POLYMYXIN — *which sets at least two antibiotics against each of the organisms commonly associated with mastitis. In this way, bacterial resistance is more readily overcome and less likely to develop.*



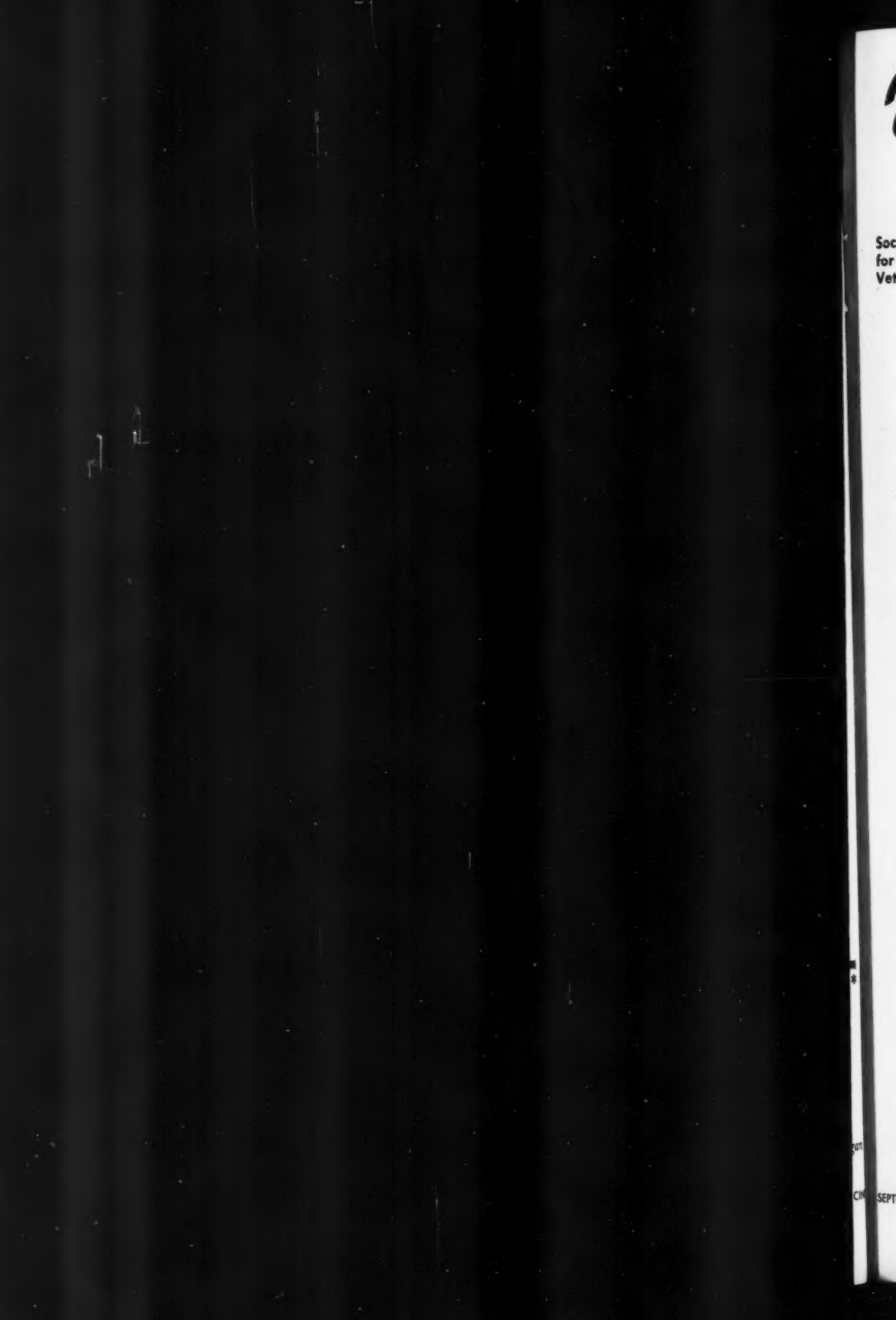
Treat the inflammation in the interalveolar tissue
with CORTEF* *(hydrocortisone) acetate, most potent of the natural anti-inflammatory corticosteroids. Control of the inflammation and swelling around the infected alveoli helps reduce scarring and falling-off in milk production.*

Teatube*-CORBIOT*

Each 10 Gram, single-dose tube contains 20 mg. hydrocortisone (CORTEF) *acetate, 250 mg. neomycin sulfate (equiv. to 175 mg. base), 250,000 units procaine penicillin G, 50,000 units polymyxin B sulfate, and 50 mg. chlorobutanol in a special, milk-miscible base.*

*TRADEMARK, REG. U.S. PAT. OFF.

VETERINARY MEDICAL DEPARTMENT **Upjohn** *The Upjohn Company, Kalamazoo, Michigan*



Social Security for Self Employed Veterinarians

During the final days of the 1956 session, Congress passed and the President signed into law a measure to expand Social Security coverage which changes features of the now current legislation. These changes also include added benefits with the inevitable boost in Social Security taxes.

Professional persons, except physicians, are now included under the provisions of the act. Self-employed veterinarians are among this group subject to compulsory provisions of the law. This means that practitioners will be required to pay (no option) social security taxes in proportion to income earned, exactly as any other worker, except in respect to the variation in schedule and rates.

As the law now provides, employees and employers each pay 2% of the gross earnings of employees up to $4,200 per year. Self employed persons pay 3% on annual earnings up to $4,200. Social Security taxes now total 4% of annual earnings of employed workers and 3% of those self employed persons. The new law, effective on January 1, 1957 raises tax rates to 2¼% for employee and employer each (total 5½%) and to 3.37½% for self employed persons.

Instructions to implement new provisions of the Social Security Law have not been distributed to field offices. It is understood, however, that veterinary practitioners must pay at the time of filing their income tax reports for 1956 (April 15, 1957), 3% on gross earnings from practice (up to $4,200) as Social Security taxes. This will be a maximum of $126 added tax for 1956. In this respect the law is retroactive to last January 1. Earnings from January 1957 will be subject to the new rate of 3.37½%. It has not been made clear what if any rate ceiling has been applied.

Pensions for self employed persons embraced by the latest act of Congress will commence in mid-1957 for those reaching retirement age of 65 years. How "wage credits" will influence those retiring in 1957 must await implementation of the new law's provisions.

Veterinarians should apply to the district Social Security office for detailed information and application forms for Social Security cards; or by mail, application forms available at the post office.

VETERINARY Medicine

Established 1905

Registered in U. S. Patent Office

A Monthly Magazine Devoted to the Promotion of the Art and Science of Veterinary Medicine

Vol. LI **SEPTEMBER 1956** **No. 9**

Published Monthly by the

VETERINARY MEDICINE PUBLISHING CO.

Suite 803, Livestock Exchange Building
Kansas City 2, Missouri, U.S.A.
Telephone: Victor 2-2985

—EDITOR—

ROBERT L. ANDERES, B.S., D.V.M.

—DEPARTMENT EDITORS—

R. R. DYKSTRA, D.V.M.
Manhattan, Kansas

MORRIS ERDHEIM, D.V.M.
Chicago, Illinois

A. O. FOSTER, B.A., M.A., Sc.D.
Beltsville, Maryland

W. R. HINSHAW, D.V.M., Ph.D.
Frederick, Maryland

JAMES H. STEELE, D.V.M., M.P.H.
Atlanta, Georgia

—REPRESENTATIVE—

H. J. Mostyn, 125 Cordova Blvd.
St. Petersburg 4, Fla.

SUBSCRIPTION RATES. One year, $5.00; two years, $8.75; three years, $12.00. Single copy, 50c. U. S. Funds. Postage prepaid. Authorized agents will present letter of collection authority. Pay no money to others.

Entered as second class matter at the post office at Kansas City, Missouri. Entered as second class matter under the title of the American Journal of Veterinary Medicine, July 19, 1910, at Chicago, Illinois, under the Act of March 3, 1879.

All matter appearing in this publication is copyrighted. No part of it may be reproduced without written permission. Permission will be given if the purpose is unobjectionable. If there be any question as to the propriety of reproduction the author will be consulted.

CHANGE OF ADDRESS: Prompt notice of change of address is requested to assure accurate mailing, giving old and new address. Address all communications to Veterinary Medicine, Suite 803, Livestock Exchange Bldg., Kansas City 2, Missouri.

Copyright, 1956, by the Veterinary Medicine Publishing Co., Kansas City 2, Missouri

In This Issue . . .

General Features . . .

Indiana Veterinary Medical Association 72nd Annual Convention 401
Cervical Lymph Gland Abscesses—H. C. Smith 402
Trends In Dairy Cattle Practice—Lester Proctor 403
Diagnosis of Poultry Diseases—Wilson Henderson 407
New Developments in Swine Nutrition of Interest to Veterinarians—J. H. Conrad 410
Clinical Use of a New Nitrofuran Dosage Form in the Retained Placenta Syndrome in Cattle—S. V. Jones, G. G. Belloff, and H. D. B. Roberts 413
Some Complications Incidental to Swine Production—R. F. Baker 416
Practical Laboratory Procedures for the Practitioner—James W. Newberne 419
Seborrhea Oleosa in Pigs—M. Ristic, D. A. Sanders, and H. D. Wallace 421
Panel On Large Animal Diseases 423
Advances Made in Swine Practice—Part IX —Transmissible Gastroenteritis—H. C. Smith 425
The Brucellosis Eradication Program in 12 Illinois State-Owned Dairy Herds—H. S. Bryan and Robert Graham 441

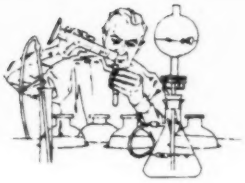
Small Animal Practice . . .

Some Concepts of Canine Distemper Immunication—Richard L. Ott 427
Cats And Unusual Pets Treated in My Practice—L. E. Fisher 432

Editorial Comment . . .

Maintenance Requirements for Male Deer 406
Early Fecundity in a Heifer 412
Arteriosclerosis in Animal Species 418
Cobalt Supplement 422
Fur Chewing in Chinchilla 434
Tularemia a Human Heatlh Hazard 434
Preference for Meat 444
Insect Pests of Livestock 444
Psychic Trauma Caused by Linguistic Meaninglessness 445
Health Physics 445
Influence of Milking Schedule on Production 445
Contagious Ecthyma Transmissible to Man 445

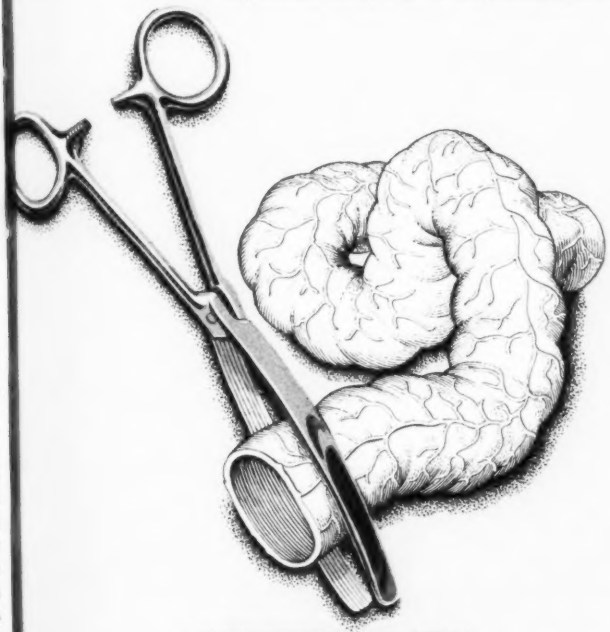
Principles of Animal Health—R. R. Dykstra 446
Veterinary Nutrition—Morris Erdheim 447
Veterinary Parasitology—A. O. Foster 448
Poultry Practice Problems—W. R. Hinshaw 449
Public Health—James H. Steele 450
Meeting Calendar L
Necrology LIV



New Veterinary Products of Original Schering Research

VARITON COMPOUND VETERINARY

diphemanil methylsulfate and phthalylsulfacetamide



"Chemo-Cholinergic Clamp on Diarrhea"

ANTIMOTILITY

ANTISECRETORY

ANTI-INFLAMMATORY

ANTIBACTERIAL

VARITON® COMPOUND Boluses (large animals), Jar of 24; 6 jars of 24 per jar.

VARITON COMPOUND Tablets (small animals), Bottles of 100.

Schering

"Meti-steroid" Products

METICORTEN *VETERINARY*

prednisone

Outstanding Clinical Results in —

SUMMER ECZEMAS[1,2]

BOVINE KETOSIS[2-4]

STRESS CONDITIONS[1,2]

INTRAMUSCULAR INJECTION

METICORTEN* Aqueous Suspension, 40 mg./cc., 5 cc. vial, boxes of 1, 6, 72; 10 mg./cc., 10 cc. vial, boxes of 1, 6, 72.

ORAL THERAPY

METICORTEN Tablets, 2.5 and 5 mg., bottles of 30, 100.

REFERENCES

1. Koger, R. B.: Vet. Med. *50*:713, 1955.
2. Chambers, E. E.: North Am. Veterinarian *37*:105, 1956.
3. Shaw, J. C.; Gessert, R. A., and Chung, A. C.: North Am. Veterinarian *36*:918, 1955.
4. Morris, R. C., and Hall, C. E.: J.A.V.M.A. *128*:132, 1956.

Schering Veterinary Research

METICORTELONE

prednisolone acetate

acetate

aqueous suspension

VETERINARY

Especially for intra-articular injection —

In INFLAMMATORY CONDITIONS of the JOINTS

METICORTELONE® Acetate Aqueous Suspension, 25 mg./cc., 10 cc. vial, box of 1, cartons of 6.

METIMYD

prednisolone acetate and sulfacetamide sodium

Ointment with Neomycin

METICORTELONE Acetate

Sulfacetamide Sodium

Neomycin Sulfate

FOR TOPICAL EYE, EAR, AND SKIN THERAPY OF INFLAMMATION, EDEMA, ALLERGY

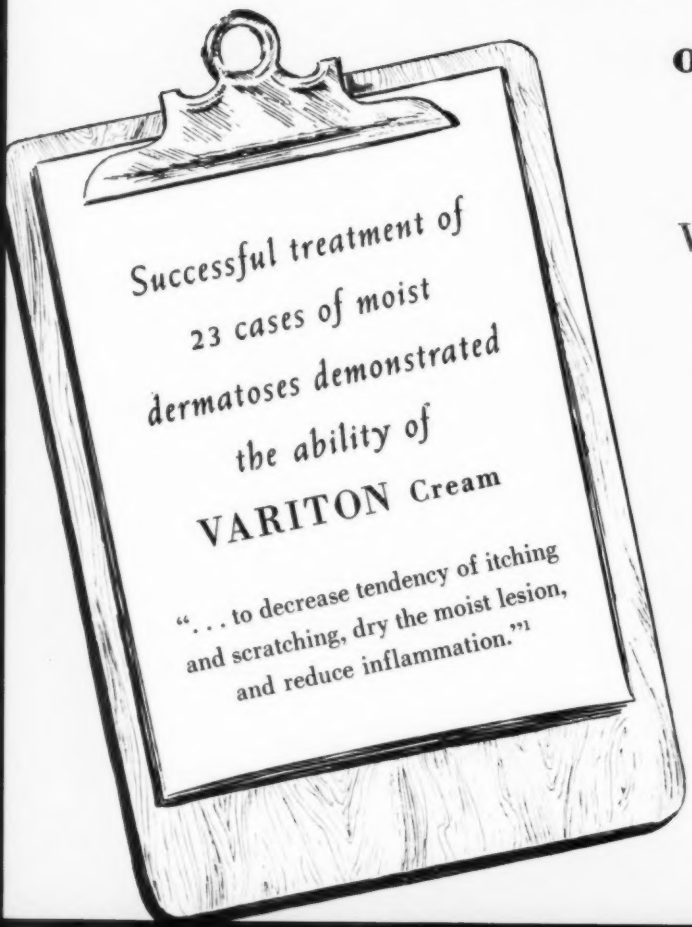
METIMYD* Ointment with Neomycin, ⅛ oz. tube, boxes of 1, 12; 3 boxes of 12.

A New Therapeutic Approach in Veterinary Medicine

VARITON CREAM VETERINARY

diphemanil methylsulfate

topical anticholinergic for better control of dermatoses


Successful treatment of
23 cases of moist
dermatoses demonstrated
the ability of
VARITON Cream
"... to decrease tendency of itching and scratching, dry the moist lesion, and reduce inflammation."[1]

VARITON® Cream 2%
50 Gm. tube and 20 Gm. tube.

1. Phillips, L. R.: Vet. Med. *51*:232, 1956.

SCHERING

BLOOMFIELD
NEW JERSEY

PARLAMATE

piperazine citrate, PARLAM

eliminates WORMS in one treatment

'PARLAMATE' IS IDEAL for LARGE and SMALL ANIMAL USE

Safe New All-Species, Anthelmintic up to 85-100% Effective Against Roundworms and Nodular Worms

- Safe, fast and most effective.
- Non-toxic and easily tolerated.
- No hair or feather-staining, hepatic damage, gastro-intestinal irritation, or other serious side effects.
- No pretreatment starving or purging necessary.
- Very palatable.
- Easily administered in feed or drinking water, or by dose syringe, drench or stomach tube.
- Only 1 treatment needed.
- 85-100% effective against mature and immature large roundworms (Ascaris) and nodular worms (Oesophagostomum).
- Long acting durable effect; parasites passed for several days.
- Economical to use.

DOSAGE FORMS

'PARLAMATE' Powder (contains 100% piperazine citrate). In preweighed dispensing packages convenient for office and field use.

Bottles of 1 oz., 4 ozs., 1 lb.

'PARLAMATE' Tablets, 250 mg. (each tablet contains the equivalent of 100 mg. available piperazine).

Bottles of 100 and 1,000 tablets.

'PARLAMATE' Liquid. (Each teaspoonful, approximately 5 cc., supplies 250 mg. piperazine citrate, which is equivalent to 100 mg. available piperazine.)

Bottles of 1 pint and 1 gallon.

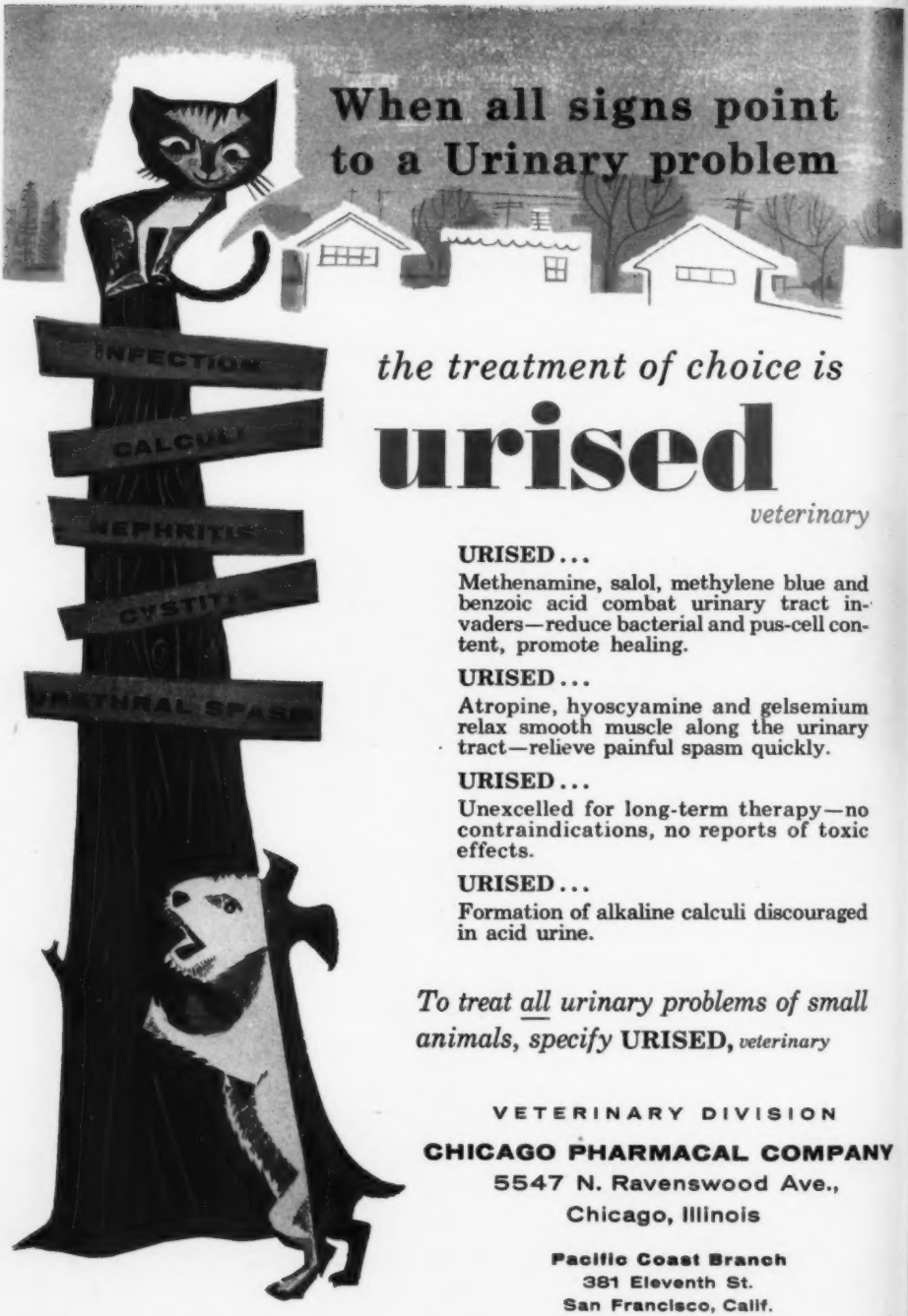
'PARLAMATE' IS NOW AVAILABLE FOR IMMEDIATE DELIVERY

At Your Supplier, or Write

Parlam CORPORATION • 340 Canal Street, New York 13, N. Y.

"Devoted to progressive veterinary research for the development of superior products for graduate veterinarians."

Sole Canadian Distributor: Veterinary Medical Supply Co. of Canada, 6579 Somerled Ave., Montreal, Que.



the treatment of choice is

urised

veterinary

URISED...
Methenamine, salol, methylene blue and benzoic acid combat urinary tract invaders—reduce bacterial and pus-cell content, promote healing.

URISED...
Atropine, hyoscyamine and gelsemium relax smooth muscle along the urinary tract—relieve painful spasm quickly.

URISED...
Unexcelled for long-term therapy—no contraindications, no reports of toxic effects.

URISED...
Formation of alkaline calculi discouraged in acid urine.

To treat all urinary problems of small animals, specify **URISED,** *veterinary*

VETERINARY DIVISION
CHICAGO PHARMACAL COMPANY
5547 N. Ravenswood Ave.,
Chicago, Illinois

Pacific Coast Branch
381 Eleventh St.
San Francisco, Calif.

Send for literature and clinical trial supply of **URISED,** *veterinary*

We Look For *TROUBLE* Before It Happens!

THE MAN IN THE SWAMP HOLLY ORANGE TRUCK . . .

. . . is there for just one reason — to make sure that your cows are among the millions milked on time tonight with Genuine Surge TUG & PULL Milking.

Year after year he tries to get to your farm BEFORE you need him. When you do need him right now he usually gets there, and he knows what to do when he does get there. He has had a lot of training and experience.

Organized Surge Service is mighty valuable to you when you put the milk into a bucket . . . it is worth even more the day that you begin to put the milk into a pipe line. It's a mighty comfortable feeling to know your cow milking is backed by Organized Surge Service.

Copyright 1956 Babson Bros. Co.

BABSON BROS. CO.

2843 West 19th Street • Chicago 23, Illinois

ATLANTA • HOUSTON • KANSAS CITY • MINNEAPOLIS
SACRAMENTO • SEATTLE • SYRACUSE • TORONTO

SURGE

GROWN entirely IN GLASS

Viracine is the only tissue cultured hog cholera vaccine. It provides live modified virus completely controlled and checked for virulence, safety and potency! Animal passage plays no part in its modification and has no part in its production. In the face of known exposure to hog cholera, pigs vaccinated as long as three years before with VIRACINE and anti-hog cholera serum have proved to be SOLIDLY IMMUNE.

The proved way to build

SOLID IMMUNITY

Of the three types of live, attenuated hog cholera vaccines on the market today, only one (Viracine—Tissued Cultured) is not available to the layman under one label or another. Viracine is your vaccine exclusively. It comes in 5, 25, and 50 dose packages, complete with diluent. Use Viracine and you'll see the difference—in the clean, white dried vaccine, in the nearly clear, restored vaccine and in the immunity produced in the pig. Only Viracine offers you all these "grown in glass" advantages!

CUTTER Laboratories
Berkeley, Calif. • Chicago Ill.
LEADER FOR YEARS IN HOG CHOLERA VACCINES.

FOR PROBLEM HERDS **B.T.V.®/CUTTER**
• Safe, too, for pregnant sows • Can't spread hog cholera • Does not throw pigs off feed • No virus setback • Economical to use.
"Millions of hogs have gone to market protected by B.T.V."

WHEN ONE VETERINARIAN
tells you about Vitamineral products, *you listen...*
WHEN A DOZEN
recommend VpC supplements, *you're impressed...*

BUT WHEN OVER

8,000

—licensed graduate veterinarians—recommend and dispense Vitamineral supplements *there can be no doubt!* VpC products *are* a vital benefit to the livestock and poultry in your charge . . . a definite money-maker and money-saver for your clients . . . an exclusive prestige item for the veterinary profession.

TODAY, WRITE FOR
THE NEWEST EDITION
OF THE VpC
VETERINARIAN'S FEED BOOK

SOLD TO VETERINARIANS ONLY
VITAMINERAL
PRODUCTS COMPANY
PEORIA 3, ILLINOIS
Dependable supplement feeds since 1915

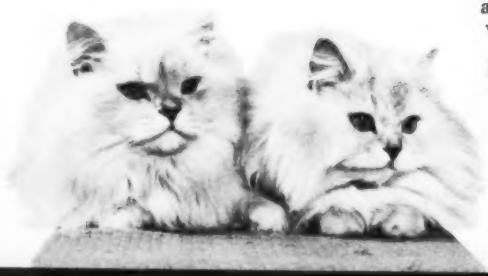
for good nutrition.

11 *essential vitamins*
9 *vital minerals*

IN BALANCE . . .

VIONATE is a reliable source for all the vitamins and minerals known to be essential to the diet of dogs, cats, fur-bearing animals, horses and calves. Vionate is a *balanced* vitamin and mineral supplement — formulated to eliminate the need for partial supplementation, and to provide an adequate, balanced minimum daily intake of fat-soluble vitamins, B-complex vitamins, and essential minerals. Vionate is recommended for the prevention of all vitamin and mineral deficiency diseases, as well as for use therapeutically when deficiency symptoms are present.

VIONATE contains 11 VITAMINS, 9 MINERALS. Each of the vitamins and minerals in Vionate fulfills a specific need in growth, health, vigor, reproduction and general well-being. Vionate is particularly recommended for pregnant or lactating females to provide an abundant supply of bone-building calcium and phosphorus in the proper ratio, in addition to ample vitamin D to assure thorough assimilation. Vionate is important for weanlings and sucklings to provide the vitamins and minerals essential for fast growth, sound tooth and skeletal development, and for all fur-bearing animals to promote healthy skin and glossy shining coat.



n. prescribe VIONATE®

recommended for

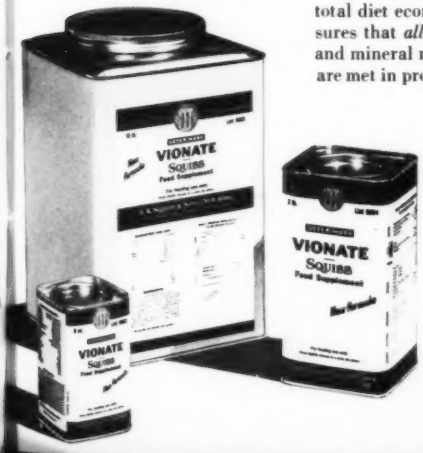
- Sound skeletal development in young
- Pregnant or lactating dams
- Prevention and treatment of deficiency diseases
- Maximum growth, health, vigor
- Healthy skin, glossy coat and fur
- Follow-up therapy after stress

VIONATE *contains*

VITAMINS		MINERALS	
Vitamin A	37,000 U.S.P. units per lb.	Salt	6.6%
Vitamin D_3	3,700 U.S.P. units per lb.	Calcium	7.7%
Vitamin B_1	18 mg. per lb.	Phosphorus	4.6%
Vitamin B_2	36 mg. per lb.	Iodine	.0018%
Vitamin B_6	4.5 mg. per lb.	Iron	.044%
Vitamin B_{12} activity	0.07 mg. per lb.	Cobalt	.00044%
Folic acid	1.8 mg. per lb.	Copper	.0044%
Niacin	90 mg. per lb.	Magnesium	.066%
Pantothenic acid	45 mg. per lb.	Manganese	.148%
Vitamin E	50 Int. Units per lb.		
Choline	3,300 mg. per lb.		

feeding RECOMMENDATIONS

The vitamin and mineral content of most available foods varies greatly both in *quantity* and *ratio*. To assure an adequate daily supply of these essential food elements, the feeding of Vionate is recommended once each day from date of birth. Vionate added to total diet economically insures that *all* the vitamin and mineral requirements are met in proper balance.



VIONATE is available in 8-oz., 2-lb. and 10-lb. canisters, as well as 50-lb. bags, from your favorite veterinary supply house. For further information, write: SQUIBB, *Veterinary Products Department*, 745 Fifth Avenue, New York 22, N. Y.

VIONATE is a registered Squibb trademark.

SQUIBB QUALITY

—THE PRICELESS INGREDIENT

NO. 2 OF A SERIES:

Controlling the worms in cattle with new Pheno-Fortified Salt

Q. How many states are now recommending low-level feeding of pheno for worm control?

A. At latest report, 17 states recommend this use of pheno—and the list is growing steadily. These states recognized the seriousness of the problem of stomach and intestinal worms in cattle and sheep. They found that some worm loads were light, while others were heavy. But in all cases the condition was extremely costly. Extensive research carried on in these states proved, however, that worm control was possible—if it was on a steady, everyday basis. In a majority of cases, the control program now works like this: After veterinary diagnosis and a worming dose of pheno, young dairy animals, beef stock, feeder steers and sheep are given daily low levels of the drug in a suitable carrier.

Q. How does the new practice help clean up contaminated pastures?

A. Low levels of phenothiazine in the ration substantially reduce and often stop the production of viable eggs by female parasites. Development of eggs and larvae in droppings on pasture is also inhibited as a result. This is especially important today because the trend toward more intensive use of pasture greatly increases the possibility of reinfection.

Q. Why is phenothiazine in salt especially effective for low-level feeding?

A. Because salt, an ideal carrier for pheno, is needed every day of the year by livestock; and because salt fits any feeding program. One of the best commercial products for this type of program is Sterling Green'salt—produced by the International Salt Company. Fed free choice or as the salt in feed (at the rate of 1%), Green'salt has proved to be an ideal product for low-level control. It contains salt, 10% pheno and the six essential trace minerals—iodine, cobalt, iron, copper, manganese and zinc—as well. Daily intake of Green'salt per head should be about two tablespoons for adult cattle, one-half tablespoon for sheep. This feeding should be continuous following the worming dose.

CATTLE-GRUB CONTROL: Two-year tests at the U. S. Regional Animal Disease Control Laboratory, Auburn, Ala., show that pheno (in a mixture with salt) fed free choice can result in considerably lighter infestations of cattle grubs. Treated animals had one-eighth as many grubs as the untreated.

For further information and references, write: International Salt Co., Inc., Scranton, Pennsylvania.

STERLING GREEN'SALT

Salt + 10% Pheno + Trace Minerals

Product of International Salt Co., Inc.

Ordinary mastitis ointment remains in a blob, restricting the ability of the ingredients to reach the infection.

PROOF

Terramycin®* Animal Formula for Mastitis diffuses immediately into the infected quarter

Terramycin Animal Formula for Mastitis reaches the infection quickly with full broad-spectrum action.

These photographs of translucent plastic "quarters" show the exceptionally rapid diffusion of Terramycin Animal Formula for Mastitis contrasted with the restricted spread of ordinary ointments. This is one of the reasons Terramycin Animal Formula for Mastitis is not only *effective*, but is *fast*.

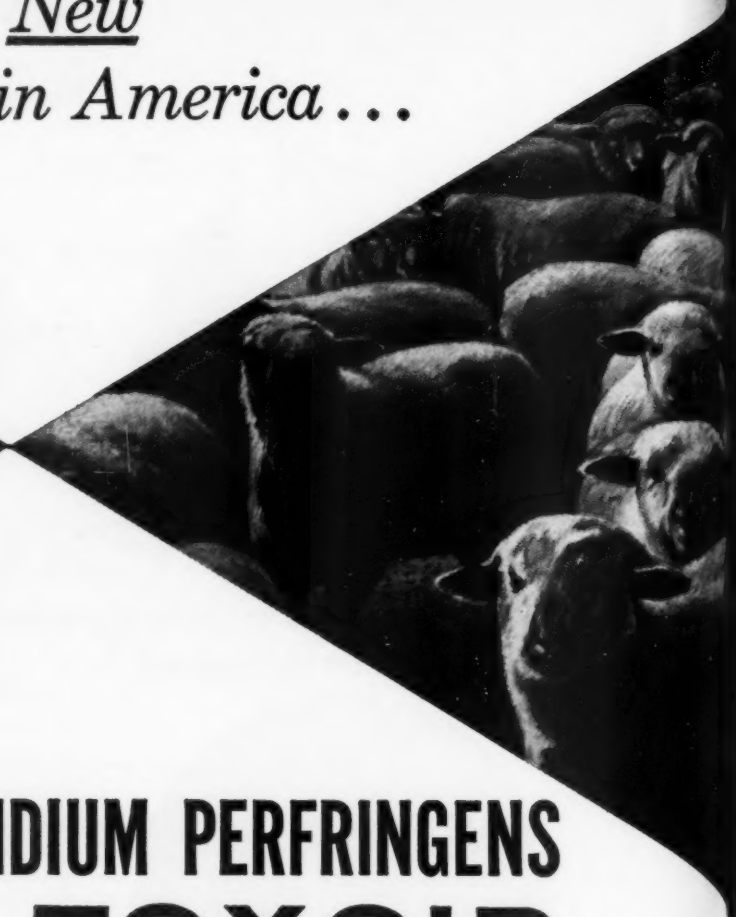
Supplied: Tubes of ½ oz. and 10-dose vials. Each gram contains 30 mg. of calcium dioxytetracycline and 10,000 units of polymyxin B sulfate.

*Brand of oxytetracycline

Department of Veterinary Medicine
PFIZER LABORATORIES
Division, Chas. Pfizer & Co., Inc.
Brooklyn 6, N. Y.

Pfizer

Brand New in America...



CLOSTRIDIUM PERFRINGENS TYPE D TOXOID

...an improved immunizing agent...

protects sheep and lambs against enterotoxemia during entire usual feeding period.*

Thousands of lambs need protection against enterotoxemia* during the feeding season. In its continuing program of research, Affiliated Laboratories has evolved improved processing techniques in the development of its new Clostridium Perfringens Type D TOXOID. These techniques have produced a stable, highly potent, more effective immunizing agent against enterotoxemia*.

This new Toxoid stimulates a much higher average and more lasting antitoxin titer in lambs (and sheep) than results from the use of bacterin. It establishes immunity within 10 days that persists for the usual feeding period.

A potency test is conducted on each serial using lambs as test animals. In addition appropriate biological and bacteriological tests **insure** the potency, purity, safety and sterility of the toxoid.

*(Caused by Clostridium Perfringens Type D toxin)

Affiliated

AFFILIATED LABORATORIES CORPORATION

The National Laboratories Corp. — Grain Belt Supply Co.
Corn Belt Laboratories, Inc. — The Gregory Laboratory, Inc.

PRODUCED FOR AND SOLD TO GRADUATE VETERINARIANS ONLY

a single-dose vaccine against canine distemper

VIROVAX*

*Trade name for: Virovax, Canine Distemper Vaccine, Modified Live Virus (Chick Embryo Origin, Vacuum Dried) (P.-M. Co. Bio. 668).

In healthy, unexposed puppies, Virovax will produce a complete cell block against distemper in two days. This effect persists until true immunity has been established.

It is satisfactory to vaccinate dogs with Virovax at 3 months of age, when a single dose is sufficient. In hospitals or kennels, where earlier exposure may be anticipated, puppies should be vaccinated shortly before or soon after weaning, with a second dose at 4 to 6 months of age.

The dose for all dogs is 2 cc., injected subcutaneously, within one hour after restoration of the vaccine. As with all immunizing procedures, normal healthy animals respond best.

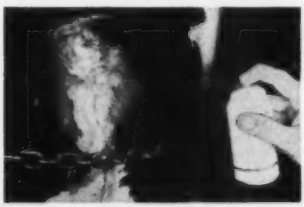
PITMAN-MOORE CO. DIVISION **ALLIED LABORATORIES, INC.** INDIANAPOLIS

New dressing procedures using

Aeroderm® LIQUID SPRAY-ON BANDAGE

"make possible superior results of surgery considered hazardous only a few years ago."[1]

TEAT SURGERY—After teat wall is closed, wound is sprayed with Aeroderm. Plastic dressing is also used to seal the flange of teat cannula in place.[1]



PROLAPSE OF THE VAGINA—Surgical closure of upper portion of vulva with wire sutures is dressed with Aeroderm, minimizing fecal contamination during healing.[1]

TAIL SURGERY—Docked tail of 4-month-old pup is dressed with Aeroderm to avoid injury by licking and to keep wound clean. (Photo courtesy Dr. R. E. Miller, Richmond, Indiana.)

Two or three light coats of Aeroderm are sprayed directly onto the aseptic wound, allowing a few seconds for drying between coats. The tough, flexible, transparent film which forms guards against infection and abrasion while tissues repair normally. Aeroderm is impermeable to bacteria and outside contaminants. Aeroderm forms a protective coating to prevent excoriation by body discharges and promote healing of abraded areas.

A few of the many applications[1,2,3,4] of Aeroderm are shown at the left. In large animals, Watts[2] reports "satisfactory results" in rumenotomies, urethrotomies, cesarean sections, herniorrhaphies and teat surgery. In small animals, Wendt[3] reports "the opportunity for introduction of infection is held to a minimum" in burns, surgical wounds and excoriation.

Aeroderm is sterile and can be taken on calls conveniently. Cost of dressing as applied is about ½ cent per square inch.

1. Conner, G.H.: Vet. Med. 50:259 (June) 1955.
2. Watts, R.E.: J.A.V.M.A. 125:40 (July) 1954.
3. Wendt, W. E.: Personal communication (Sept.) 1954.
4. Choy, D.S.J., and Wendt, W.E.: U.S. Armed Forces M.J. 3:1241 (Sept.) 1952.

Supplied in 6-oz. aerosol-type dispenser.
Available through your veterinary supply dealer.

Send for literature and further information

AEROPLAST CORPORATION 420 Dellrose Avenue
Dayton 3, Ohio

a new form!

Nolvasan

TRADE MARK

suspension

1 Gm. chlorhexidine hydrochloride in special base.
28 cc. disposable syringe with plastic pipette.

for treatment of

metritis
vaginitis
preputial infections
penetrating wounds

Specially formulated for intrauterine administration through an artificial insemination pipette when the cervix is closed. Used successfully for clearing vibrio infection from cows and bulls.* Nonirritating and nontoxic, as are all Nolvasan preparations.

*Herrick, J. R. (1956) Bio-Chem. Rev., 26:1, 8.

FORT DODGE

Fort Dodge Laboratories, Inc., Fort Dodge, Iowa

season after season **Swivax®**

still the **hog cholera vaccine**

to use for

safety

economy

effectiveness

May be used with or without serum.

Minimizes post-vaccination difficulties.

One injection confers solid immunity for two years, probably longer.

Use with serum adds *immediate* protection to this long-lasting immunity.

Cannot infect premises with hog-cholera.

Cannot introduce other diseases to swine.

Successfully used on millions of swine during a number of successive vaccinating seasons.

—AND SOLD ONLY TO VETERINARIANS

Swivax®

HOG-CHOLERA VACCINE

Licensed under U. S. Patent 2518978

modified live virus • rabbit origin • vacuum dried

In 2 dose, 5 dose, 25 dose and 50 dose packages.

Pitman-Moore Company, Division of

ALLIED LABORATORIES, INC.

Indiana Veterinary Medical Association 72nd Annual Convention

ON suceeding pages of this issue of VETERINARY MEDICINE is presented much of the literary program of the 72nd annual convention of the Indiana Veterinary Medical Association which convened at Indianapolis on January 11-13, 1956.

Because of the nature of its presentation, a sizeable quantity of material served for the enlightenment and enjoyment only of those present. It did not lend itself for reproduction and thus becoming part and parcel of professional literature. This was not unusual for Indiana since employment of a variety of presentation technics that effectively teach by emphasizing through illustration by motion pictures, slides, and graphs are now in universal use. Much thought has been given to this matter for benefit of those not fortunate enough to have been in attendance, but problems in many instances have so far appeared insurmountable.

All material lending itself to effective reproduction and selected to interest the profession generally has been included in this single issue.

What has been said of much informative material presented that does not appear herein also applies to pleasurable entertainment features which were as usual well-planned for the enjoyment of members and guests, and their wives.

Dr. J. E. Jordan

Animal Disease Control

Dr. L. A. Barnes, federal veterinarian of the Animal Disease and Eradication Branch, ARS, for Indiana stated that the brucellosis eradication program outlined for Indiana had progressed satisfactorily. During 1954, 3.5% of animals tested reacted to the blood agglutination test; for 1955 incidence rate was 2.3% reactors. Over twice as many tests were conducted in 1955 as in 1954. Calfhood vaccination increased during the same period from 55,000 to 58,000 head. He also pointed out that 30% of the herds tested during 1954 were classified as "suspicious" for infection; whereas, only 18% were so classified for 1955. From these significant percentages Doctor Barnes takes heart that progress in eradication is made not only in clear cut reduction of disease incidence but in proficiency in interpreting results of test procedures.

It was also reported that sheep exposed to scrapie had been condemned and removed from 61 farms in Indiana. The policy of condemnation is followed assidiously in Indiana where outbreaks have occurred in farm flocks.

State Veterinarian Dr. Joe Green reported among other statistical data that fewer cases of rabies had occurred in the state during 1955 than any previous year of record with the State Board of Health. Dr. Paul T. White pointed out that whereas only 34 cases of rabies were reported as clinical rabies, yet 136 positive heads were reported by the state laboratory. Doctor Green recommended that the state veterinary group testify before legislative committees who handle matters concerning livestock disease control programs and spoke encouragingly of cooperation of various groups toward well directed efforts.

Public Relations

The Radio and Television Programs Committee submitted a report concerning the continuing cooperation of the Association with the

A.V.M.A. for public relations. Practitioners are called upon for weekly broadcasts and television appearances utilizing scrip material prepared at the Chicago office of the A.V.M.A. He recommended preparation of visual type material, rather than employment of interviews, for TV audiences. Program time is without cost to the association but is worked in with farm editors of stations carrying these to viewers and listeners.

Officers

New officers to serve the association for 1956 include: Dr. J. E. Jordan, Indianapolis, president; Dr. R. W. Worley, South Bend, president-elect; and Dr. Russell F. Portman, Lafayette, vice-president. Dr. L. M. Borst, Indianapolis, was reelected secretary-treasurer.

▼ ▼ ▼

Cervical Lymph Gland Abscesses

H. C. SMITH,* D.V.M., Sioux City, Iowa

Swellings in the throat region of swine offer a diagnostic challenge to practicing veterinarians. In small pigs, the swellings are usually due to injuries in the throat region as a result of the improper administration of medicinal agents for anemia. Many times the energetic farmer will injure the pharynx and adjacent areas with the spout of an oil can containing the anemia medicine.

In years past, it was not uncommon to find several pigs with swollen throats due to the improper administration of liquid or capsules of anthelmintics being placed in the blind sack of the esophagus.

In older hogs, anthrax manifests itself by an edema of the throat and corresponding lymph glands. The lymphatic glands are usually greatly enlarged and hemorrhagic.

Some adult swine may develop throat enlargement as a result of a severe tonsillitis similar to what is commonly called "quinsy" in man.

In past years, A. J. Karlson of the Mayo Research Foundation observed that some of the apparently enlarged cervical lymph glands and enlarged tonsils of swine were found to contain *Corynebacterium equi.*

When the lymph glands are excised, they are similar to those seen in swine tuberculosis.

We have isolated the Corynebacterium from the lungs of swine on many occasions. It is quite common in cases of swine pneumonia.

R. A. Packer of Iowa State College reported that a hemolytic streptococci had been isolated from the cervical abscesses of swine. The condition can be reproduced by adding the organisms to the feed and drinking water. It is thought that the entrance of the organisms into the body is by way of the mouth. Cultures of the organisms, when injected intravenously into susceptible swine, did not reproduce the cervical abscesses. Injections made subcutaneously produced a few abscesses.

Veterinarians should be cautioned not to open abscesses because of contamination of feed and water. If susceptible swine are placed on a farm where abscesses have either been lanced or have broken, the new swine usually develop the condition.

Abscesses in the jowls of swine, other than tuberculous lesions, are reported in up to 5% of total carcasses slaughtered. These are tagged "U. S. Retained". Final inspection results in loss due to condemnation of either carcasses or heads, or extensive trimming of involved tissue.

J. R. Collier of Ames, Iowa reported that the condition in swine commonly called "strangles," "feeder boils," or jowl abscesses is due to *beta* hemolytic streptococci, but that *E. coli, Past. multicida* and *Cory. pyogenes* may also be isolated in some cases.

It appears that this *beta* hemolytic streptococcus might produce a good antigenic bacterin because swine vaccinated with the bacterin were resistant to the feeding of cultures.

A. W. Krause of Cherokee, Iowa reported that, when herds of affected swine were placed on hi-amine® compound (ethlyenediamine

(Continued on page 406)

*Allied Laboratories, Inc.

®Pitman-Moore Company, Indianapolis, Ind.

Trends In Dairy Cattle Practice†

LESTER PROCTOR, D.V.M., Oelwein, Iowa

REVOLUTIONARY changes have occurred in dairy practice during the past 20 years. These have come about largely through the development of superior chemotherapeutic agents classed as sulfonamides and antibiotics. Certain additional changes not associated with these drugs have also occurred which are worthy of recounting. Certain other methods and practices have withstood all proposals for change.

Practices of 20 years ago seem archaic. Progress has been so rapid, practices so changed as to mark the recent past as an age of phenomenal development. This was pointed out by Dr. M. G. Fincher in an article, Progress of Veterinary Medicine as Related to Cattle Practice, appearing in the Anniversary Issue of VETERINARY MEDICINE (50:537, [Nov.], 1955). This article ought to be on the must reading list of every cattle practitioner. It sharpens prespective of the future to consider the basis of recent progress.

Digestive Disturbances

A group of digestive disturbances are common in dairy cattle fed for maximum production. Among these, bloat reputedly is responsible for more death of good dairy cows than any other disease condition. Incidence of bloat appears to increase in herds in direct proportion with efforts to improve fertility of soils on which legume hay crops and other grasses are raised. In our practice bloat on blue grass is not uncommon. In early years frothy bloat was rare; now it is the rule. We need to learn what physiochemical changes have occurred in the rumen of dairy cows and why these evident differences in manifestation of common disorders. New agents (silicones) for the treatment of frothy bloat have been of inestimable value in saving the lives of countless animals. They leave much to be desired of a treatment for some cases. Rumenotomy is recommended in selected cases and appears to be the only dependable solution to the bloat problem after engorgment on green corn and similar forage. Animals engorged on even small amounts of threshed soybeans present an exceptional problem and do not respond to accepted methods for handling frothy bloat. Experience has taught us that it is preferred to provide a temporary opening into the rumen either by positioning a large trocar or providing a surgical fistula thus changing rumen environment sufficiently to reduce toxin formation.

Primary obstipation, a classical entity 20 years ago, is rare nowadays. There is, to be sure, a marked increase in the number of patients we refer to as having "gone off-feed." A few of these may be classified as cases of traumatic gastritis, hepatitis, or metritis, but the cause of the syndrome characterized by varying degrees of inappetence remains obscure.

†Presented at the 72nd annual convention of the Indiana Veterinary Medical Association, Indianapolis, Jan. 11-13, 1956.

Formerly, we administered saline purge which relieved symptoms but caused dehydration and subsequent loss of production. Nowadays, our therapy is aimed at restoration of rumen function. Results using a variety of products claimed to have virtue have been inconsistent and discouraging. In our hands, the use of commercial rumen bacteria and direct transplant of collected rumen material has been of limited value. It appears to us that if the rumen is in a physiologically abnormal state transplants of rumen bacteria fail to survive. Some effort needs to be made toward restoration of the physiological normal in the rumen prior to and with additions of organisms common to the healthy organ. Methods and products presently available are not the final solution to treatment of those cows referred to as being "off-feed."

Milk Fever

Hypocalcemia was formerly treated by giving massive doses of calcium gluconate intravenously and subcutaneously and repeating the treatment at rather frequent intervals. Now, our practice is directed toward lengthening the treatment period. If the patients indicates favorable response to initial injection there is seldom need for additional calcium therapy for 12 hours, and in some cases 24 hours; even though the cow remains in recumbency. A delay of 24 hours is the standard and general rule after the second treatment. We have observed that saturating the patient suffering milk fever with massive doses of calcium does not shorten recovery time but, at least in some instances, puts undue and unnecessary stress on the heart and other vital organs. The trend amongst experienced practitioners is to give metabolic processes time to adjust themselves. The calf must be separated from the dam. In the event it is necessary to provide colostrum ascertain that a limited quantity is nursed from each quarter rather than from one. Insistence that no milking be done for 48 hours after the final treatment, and that no grain or green pasture be provided for a like period, will reduce relapses to a minimum. Failure of a cow to respond to calcium therapy suggests that diagnosis of milk fever be reconfirmed.

Dystocia

Dystocia, nightmare of many young practitioners, has not changed much in 20 years. With the advent of widespread artificial insemination, larger fetuses were the rule and dystocia common. A few generations of improved breeding has at least partially resolved this situation.

Development ot the fetal extractors has been a boon to the practioner by reducing labor involved. Improvement in anesthesia and technics for cesarian section have also served the veterinarian as well as the cow.

Profitable production and reproduction are dependent on the skill and care of the operator in problems associated with retained placentae. There has indeed been a noticeable change in that few stubborn cases are referred for treatment. Perhaps this may be considered a dividend from the brucellosis eradication effort. Removal of retained placentae is one of the most important services of a veterinarian in a dairy area. Though one comes to regard the procedure as routine, seldom are any two cases exactly similar.

Hormone therapy, in our hands, has been too inconsistent to accept as a routine measure.

Over recent years recommended practices in intrauterine therapy have altered a great deal. Early we gave intrauterine douche followed by insertion of capsules containing charcoal and chloramine T. The charcoal had some absorptive properties, but the particles of chloramine T caused a rather severe reaction to the endometrium. Later, oxidizing agents were recommended but proved of limited value. These were followed by use of urea and about the same time sulfonamides, the latter quickly favored as a standard intrauterine agent.

There are now available some new improved chemicals that are gaining high regard for use following removal of retained placentae. Some of the broad-spectrum antibiotics are certainly indicated. Perhaps enzyme therapy may prove useful to aid expulsion of small portions not removed by other means which may contribute to metritis.

Various contrivances used to replace eversion of the uterus have been abandoned largely. With the proper use of epidural anesthesia and a careful survey of the altered position of parts, most eversions can be replaced with minimum effort. Every practitioner has learned that the cervix, if everted, must be returned to near normal position before an attempt is made to replace the uterus properly. Also, the importance of elevation of the eversion to the level of the vulva, and the exercise of necessary care to avoid trauma to the endometrium, are essential to a satisfactory repair job. Consider rubber gloves for this operation, for the benefit of the cow.

Incidence of metritis appears to be increasing. Acute septicemic types are more prevalent, at least in our practice area. It is often a herd problem, affecting 20% of the cows in

a single calving season. Fortunately antibiotics are efficacious treatment agents in most of these cases.

Pneumonia-Enteritis Complex

The incidence and severity of the common affectation of baby calves, referred to as the pneumonia-enteritis complex, has changed little during the past 20 years. The syndrome is observed from the mild attack that responds readily to modern-day therapy to the fulminating infection causing death with 48 hours. Isolation of calves, proper barn ventilation, and good nutrition, have served as control measures of this greatest killer of calves. Wisconsin researchers have demonstrated quite definitely that the disease has a virus etiology. Help of able scientists is needed on problems both of control and treatment.

During recent years, there has been a marked increase in spontaneous respiratory infection in dairy cattle. Outbreaks in former years were almost invariably attributed to the addition of new animals. Nowadays we observe explosive outbreaks of respiratory disease without the history of additions of new stock or otherwise explained. Nearly every year we are called during certain seasons when many widely scattered herds succumb to severe pneumonia which subside in the area after a few days or weeks. Without apparent doubt there has been an increase in the virulence of the etiological agent or agents. The reservoir of this infection needs also to be revealed.

Mastitis

Review of the literature of even recent years reveals that about 85% of mastitis in dairy cows was due to streptococci. Those severely inflamed though transient cases are being treated from the box of mastitis tubes on the barn shelf. Nowadays this type of mastitis is not so prevalent. The proportion of necrotic processes in the udder or interstitial type of mastitis has not increased over the years. What one does observe with increasing frequency is a toxemia associated with mastitis. Bacteriology in these cases is not clear. The condition appears as a serious threat in many herds as production in affected cows is diminished markedly and recovery during the remainder of the lactation period is disappointing. Many affected quarters are lost. The straw-colored serosanguinous secretions are familiar to those who treat dairy cows as is the severe degree of toxicity in proportion to the degree of inflammation apparent. Perhaps we should be reminded to be alert for toxic mastitis in suspected milk fever and traumatic gastritis cases.

Infertility

Infertility is one of the prices we pay for high production. Production increases have been realized recently at a rate exceeding experiences of 20 years ago. Artificial insemination has contributed much to herd production records. With these trends, all practitioners have experienced an increased demand for service to problems of infertility.

Some reproduction disorders referred are amenable to treatment. A cow with cystic ovaries responds to chorionic gonadotropin. Certain other cases of anestrum respond to hormone treatment. Antibiotics, with hormones have assisted in settling cow suffering low grade or subclinical infections of the genitalia. Many practitioners, including ourselves, are stymied by the repeat-breeder cow, the animal that exhibits no clue to abnormalcy. Examinations are negative, estrual cycle normal, yet they fail to conceive. Most of these cases are not sterile but temporarily infertile. Death of embryo is suspected in many of these.

Dairymen are requesting pregnancy examinations and referring infertility problems to practitioners with growing frequency. Many of these challenge the most astute among us.

Trends

Certain trends in the dairy field are obvious to the astute observer. Some of these will, no doubt, affect those practitioners who handle this class of livestock.

With the perfection of vitamin fortified oleomargarine, which is cheaper and a fairly good substitute for butter, consumption of the dairy product has decreased, and may be expected to decline. After support prices of butter were reduced (from 90 to 75% of parity) in April 1954, some recovery occurred in the market but a review of statistics illustrates that this move had little encouraging effect. The dairy industry has lost much of the "bread-spread" business.

Frozen desserts, prepared from vegetable oils, and milk or milk powders, and having physical properties similar to ice cream have made inroads on the ice cream manufacturer market. Consumer appear to have accepted this substitute product, which is tasty and nutritious. In 1954, 31,400,000 gal. were produced; a 30% increase over that reported for 1953. Producers in Texas produced over 17,000,000 gal. Ice cream production was reported to be 592,000,000 gal. in 1954, compared to 603,000,000 in 1953.

The distribution of whole milk has undergone and is undergoing revolutionary changes

in all parts of the country. Big business has taken over fluid milk distribution formerly handled by individual dairymen or small distribution plants. In our home town, Oelwein, Ia. we now have two or three competing distributors instead of eight independent companies operating a few years ago. Consumer demand for service has broken the long standing 5 cent a quart marketing charge. The spread now is approximately 12 cents. Producers are getting 32 cents (approximately) per gallon (8¢ per quart) while the consumer is being charged 20 to 22 cents per quart delivered three times weekly to his doorstep. The spread appears exorbitant. A wage earner with a growing family is not buying enough fluid milk to provide that quantity recommended by nutritionists for various age groups.

What do these trends mean to the practitioner? The dairy industry which has lost a sizable proportion of its market to the vegetable oil interests can expect nothing more than a continuing loss. A larger percentage of our dairy cattle practice will be with fluid milk producers where the exacting standards for producing a quality product must be met. Veterinary service to these producers will need to be the best scientific veterinary medicine can muster. Practitioners will have to adjust their operations to fewer herds having larger numbers of animals. Dairying will be more specialized so that more attention will be given to details affecting the health and production capacity of cows. If we adapt ourselves properly to the new situation it will be necessary to offer a complete veterinary service at a fee the owner can afford to pay. This does not imply that the fee would be insufficient to make profitable such professional service. If we fail to serve more of these extensive dairy operations we may become victims of the do-it-yourself forces. Our experience with large fluid milk producers is so far encouraging but we need to be alert to the necessity and desires of operators. One 35-cow grade A dairy is likely to require and request more professional service than eight or ten farm herds of 15 cows each producing cream for butter manufacturers.

A dairy practice in the days to come will continue to be a midnight to midnight practice; not an eight-hour day sort of employment.

▾ ▾ ▾

Injuries in the hip region account for more than two-thirds of the estimated $10,000,000. national annual loss from beef bruises. Loss is computed as devaluation and trim loss in the loin of bruised carcasses.

Maintenance Requirements for Male Deer*

Pennsylvania State University reports that a group of male deer, with an average weight of 165 lb., lost weight rapidly during the rutting season when they consumed only 3 lb. of feed (5,400 calories). They lost weight slowly on 3½ lb. (6,300 calories) during the late winter, and then gained weight rapidly to an average of 190 lb. when their daily consumption was increased to 7 lb. (12,000 calories) during the spring and summer. This suggests that 4 to 5 lb. (8,000 calories) of good quality air-dry feed is necessary for maintenance and weight recovery (following seasonal losses) in adult white-tailed deer weighing 150 to 200 lb. This corresponds to a minimum of 8 to 10 lb. daily of good quality native deer browse with its higher moisture content.

▾ ▾ ▾

Cervical Abscesses in Swine

(Continued from page 402)

dihydriodide) at the rate of 1 lb. to each 25 gal. of drinking water for ten days and then sodium sulfathiazole at the rate of 1 gr. per lb. of body weight per day in the drinking water for an additional ten days, response was entirely satisfactory. When hi-amine or sodium sulfathiazole were used alone, results were less than desired.

Mark Wilson of Rockwell City, Iowa reported that 2 lb. of hi-amine added to 1 ton of feed given free choice for a period of two weeks cured an entire herd that were affected with abscesses of the jowls.

For a long time, we have been suggesting the use of hi-amine at the rate of 1 lb. to 50 gal. of drinking water. This will reduce the size of the abscesses and also the incidence of infection.

Veterinarians who are called upon to examine and treat herds of swine with infected jowl abscesses should submit the jowl or preferably the entire pig to a laboratory for a bacteriological examination in order to ascertain the exact type of infection before attempting specific treatment.

The use of autogenous bacterins have, in the past, been quite successful in preventing the spread of the infection once it appears.

No doubt, within the near future preventive vaccination on many droves of swine on farms where the infection has been a troublesome factor will be practiced.

*Nutritional Requirements of White-tailed Deer for Growth and Antler Development. Penn. State Univ. Agri. Exp. Sta., Bul. 600, July 1955.

Diagnosis Of Poultry Diseases†

WILSON HENDERSON, B.S.A., M.S.A., D.V.M., Lafayette, Indiana

THE disease processes which occur in birds are essentially no different from those occuring in other animals. Therefore the veterinarian who has been trained to work with diseased animals is the most ably qualified person to make diagnoses of diseases in poultry. The average practicing veterinarian has lost this type of work partly because of his lack of attention and partly due to attitude developed by poultrymen.

Perhaps the greatest difficulty confronting the large or small animal practitioner in diagnosing poultry problems is the necessary adjustment from working with an individual animal to working with a flock or group of birds. In diagnosing troubles in poultry, one can always sacrifice one or more individuals to ascertain pathological changes occuring in the flock. After the trouble in one or two birds has been revealed the flock can be treated. It also means that when a flock is treated it is often more preventive treatment than actual "cure". For example, the treatment for blackhead is really preventive; the drugs preventing the development of the causative parasite in the birds rather than effecting return to normal of badly affected individuals. This also means that with any treatment recommended for poultry, advice should also be given on management to minimize exposure to any infective agent.

Tables 1 to 3 were designed so that practitioners who are not now regularly working with poultry might post them on the wall near the postmortem table for easy reference when actually examining birds. They cover the more common diseases observed in Indiana. They are not intended to be complete but only to list most common diseases and more important points, such as the diagnostic symptoms or lesions. They should be used in conjunction with a good set of lecture notes or with a good reference book on poultry diseases. Diseases of Poultry, by Biester and Schwarte, published by Iowa State College Press, is an excellent text and is recommended. Once the lead has been obtained from the tables, confirmation of the diagnosis in greater detail should be obtained by the use of such a reference as mentioned above.

The tables are drawn up for three age groups of chickens. Roughly these are baby chicks, growing stock, and adult birds. The majority of diseases do not occur exclusively in the age group in which they are listed, although in most cases will occur in these groups. Many diagnosticians working with poultry unconsciously work with a classification of this nature in mind.

Most veterinarians who receive any quantity of poultry for examination will find it advantageous to be able to do some laboratory work. The use of the microscope is essential, and some simple media for culturing common bacteria, such as, Salmonella, Erysipelas, et cetera, will aid the diagnostician. A few practitioners in Indiana have found this economically sound in building up a poultry practice. Not only can a better diagnosis be given, but confidence in the poultryman's mind regarding the diagnosis made will be established.

The veterinarian working with poultry should not hesitate to contact state agricultural colleges or experiment stations or veterinary schools for aid in diagnosis of poultry diseases, especially where it appears advisable to identify virus diseases. Most veterinarians have neither time nor facilities to isolate virus entities. If the practitioner decides to send specimens to a laboratory it would be advisable to also provide a complete history. It would be just as well to have the birds entered in the veterinarian's name only thus assuring proper channels for diagnostic information to be considered in the light of flock management practices.

The poultry industry would receive better service if the poultry diseases were handled through the local veterinarian and then to the laboratory if necessary. The veterinarian in the field has a big advantage over the laboratory veterinarian in that he knows the owner, neighboring conditions, and conditions on the farm. Most laboratory diagnosticians prefer to work through local practitioners because of their subjective study of the specific disease problem.

---

†Presented at the 72nd Annual Convention of the Indiana Veterinary Medical Association, Indianapolis, Jan. 11-13, 1956.

Submitted as Journal Paper no. 995, Agricultural Experiment Station, Purdue University.

TABLE 1. Conditions Primarily Found in 3-Week-Old Birds

Disease	Range in age	Cause	Diagnostic symptoms or lesions	Diagnosis made on	Control, prevention, or treatment
Omphalitis	1-10 da.	Poor incubation. Various bacteria.	"Wet" form. Edema, unhealed navel, foul odor. "Dry" form. Scabby navel, yolk glued to wall.	Symptoms.	Double incubator fumigation. Correct incubation.
Pullorum disease	1-3 wk.	Bacterium — *S. pullorum.*	Enlarged liver with necrotic areas; cheesy ceca; grayish areas in lungs.	Agglutination Test; isolation and identification.	Agglutination test; Sulfamerazine; Sulfamethazine NF 180; Sulfaquinoxaline.
Paratyphoid	1-3 wk.	Bacterium. Various Salmonella.	As pullorum.	Isolation and identification.	Exp. tube test for *S. typhimurium* only. As pullorum.
Aspergillosis	1st wk. & up	Mould — *A. fumigatus.*	Pus in air sacs; gasping; spherical nodules in lungs.	Identify mycelium or spores under low power.	Clean; find source Cu SO, —1 part to 2000 in water.
Epidemic tremor	1-6 wk.	Virus.	A few with heads vibrating laterally; many bilateral paralysis.	Symptoms.	Good nursing.
Poisoning	1-6 wk.	Phenol arsenates. Nitrophenide.	Down in legs; trembling; twisted neck.	Symptoms. Symptoms.	Starve and remove drug. Starve and remove drug.
"Edema"	1-3 wk.	Chemical salt. Fuel oil. Disinfectants.	Ascites; serous exudate under skin.	Symptoms.	Find & eliminate cause.
Chilling	1-2 wk.	Chill.	Large unabsorbed yolks; inactive; sleepy.	Symptoms & history.	Heat & good nursing.
Overheating	1-6 wk.	Heat.	Dried up; dehydrated.	Symptoms & history.	Cool & good nursing.
Empaction of gizzard	1-6 wk.	Depraved appetite.	Gizzard packed with litter.	Litter in gizzard.	Cover or remove litter.
Newcastle disease	1st wk. & up	Virus.	High mortality; gasping; air sacs cloudy; twisted necks.	H.I. S.N. Virus Iso.	Vaccination; good nursing.
Bronchitis	1st wk. & up	Virus.	High mortality; gasping; air sacs cloudy.	Symptoms S.N. Virus Iso.	Vaccination; good nursing.
Bluecomb in turkeys	1-8 wk.	Virus (?)	Enteritis.	Mortality on continuous operation.	Antibiotics.

TABLE 2. Conditions Primarily Found in Growing Birds

Disease	Range in age	Cause	Diagnostic symptoms or lesions	Diagnosis made on	Control, prevention, or treatment
Coccidiosis	3 wk. & up	Protozoa — *E. tenella* *E. necatrix* *E. ascervulino* etc.	Bloody droppings, Ceca pale. Others—pale, thin, enteritis.	Identify oocysts low power.	Sanitation; Coccidiostats, etc.
Neural lymphomatosis (Range paralysis)	7 wk. & up	Virus	Droopy wing or dragging leg, paralysis; enlarge leg, wing, or visceral nerves.	Symptoms & enlarged nerves.	Isolation & sanitation; Cull sick birds.
Encephalomalacia	2 wk. & up	Def. vit. E	Sit backed into corner; twisted neck; cerebellar surface smooth.	Symptoms & lesions.	Vit. E. less carrier oil.
Riboflavin def.	2 wk. & up	Def. vit. G	Toes curled inward; can't walk.	Symptoms & lesions.	Vit. G.
Rickets	3 wk. & up	Def. vit. D, Ca, P	Rubbery leg bones & beak; enlarged parathyroids.	Symptoms & lesions.	Correct vit. D, Ca, or P.
Dermatitis	3 wk. & up	Def. pantothenic acid (vit. B)	Sores & encrustations eyes & feet.	Symptoms & lesions.	Milk products.
Perosis	3 wk. & up	Def. biotin	Slipped tendons, thick hock joints.	Symptoms & lesions.	Correct biotin. Mfr. also
[illegible]	[illegible]	Def. vit. A	Cheesy patches in esophagus; swollen eyes; nodules gullet.	Symptoms & lesions.	Add. vit. A.
Kerrato-	3 wk. & up	Associate	Serrated areas on eyeball.	Symptoms & lesions.	Correct ventilation & litter

Dermatitis	3 wk. & up	Def. pantothenic acid (vit. B)	Sores & encrustations eyes & feet.	Symptoms & lesions.	Milk products.
Perosis	3 wk. & up	Def. biotin	Slipped tendons, thick hock joints.	Symptoms & lesions.	Correct biotin, Mn, choline.
[illegible]	[illegible]	Def. Vit. A	Cheesy pockets in esophagus; swollen eyes; nodules gullet.	Symptoms & lesions.	Add. Vit. A.
Kerrato-conjunctivitis	3 wk. & up	Associate excess NH_3	Serrated areas on eyeball. Inflamed conjunctiva.	Symptoms & lesions.	Correct ventilation & litter condition.
Blackhead	6 wk. & up	Protozoa *H. meleagridis*	Liver and Cecal Lesions.	Symptoms & lesions.	Enheptin T; keep flock moving.
Typhoid	1 wk. & up	Bacterium — *S. gallinarum*	Liver — large green.	Isolation and identification.	Agglutination test; as pullorum.
Erysipelas	4-7 mo.	Bacterium — *E. rhusiopathiae*	Usually mostly males affected; cyanosis, diffuse petechia.	Identify culture; inject pigeon.	Penicillin; bacteria.
Botulism	Any age	Bacterium — *Cl botulinum* (toxin)	"limberneck" paralysis.	Symptoms.	No treatment; remove source.
Aplastic anemia	7 wk.-14 wk.	Unknown	Paleness suggesting coccidiosis; hemorrhages breast, leg muscle, skin.	Hemorrhages & hematocrit count; pale bone marrow.	Starve; put on milk & corn.
Chronic respiratory disease	3 wk. & up	P.P.L.O.	Low mortality; gasping; cloudy air sacs; serous membrane on liver.	Inject turkey sinus.	Antibiotics.

*Bronchitis and Newcastle disease see table 1.

TABLE 3. Conditions Primarily Found in Adult Birds

Disease	Range in age	Cause	Diagnostic symptoms or lesions	Diagnosis made on	Control, prevention, or treatment
Leukosis— visceral lymphomatosis	6 wk. & up	Virus	Tumorous ovary, intestines, liver, spleen, etc.	Symptoms & lesions.	Cull.
Ocular lymphomatosis	3 mo. & up	Virus	Blind — irregular pupil.	Symptoms & lesions.	Isolation.
Osteopetratic lymphomatosis	6 mo. & up	Virus	Thick leg bones.	Thick bones.	Breed from strain not affected.
Blue Comb	Laying birds	Unknown	Blue comb, sour crop, fish flesh, Necrosis of liver, white spots on pancreas.	Symptoms & lesions.	Muriate of Potash. Molasses. Antibiotics.
Cholera	1 wk. & up	Bacterium — *P. avicida*	Petechia heart and muscle; necrosis of liver.	Isolation & identification; inject rabbit.	Sulfaquinoxaline.
Botulism	Any age	Bacterium. *Cl. botulinum* toxin	"Limberneck" paralysis.	Symptoms.	Remove source.
Typhoid	1 wk. & up	Bacterium — *S. gallinarum*	Large green liver.	Isolation & identification.	Agglutination test. As Pullorum.
Tuberculosis	Year plus	Bacterium— *Myobacterium avium*	Thin, spherical lesions of necrosis on liver and spleen.	Acid fast organism.	Sanitation. Keep only young birds.
Fowl pox	6 wk. & up	Virus	Pox lesions; canker.	Symptoms; virus isolation.	Vaccination: (1) Fowl, (2) pigeon; good nursing.
Laryngo-tracheitis	1 wk. & up	Virus	Blood in trachea — characteristic posture; gasping; coughing of blood.	Petechia on trachea; virus isolation.	Vaccination.
Coryza	1 wk. & up	Bacterium— *H. gallinarum* plus virus	Discharge eyes and nostrils.	Symptoms; isolation & identification.	Extra vitamin A; sulfathiazole.
Newcastle disease	1 wk. & up	Virus	Twisted necks; gasping; air sac infection; egg production to zero.	H.I. S.N. virus isolation.	Vaccination; good nursing.
Bronchitis	1 wk. & up	Virus	Egg production drop; severe gasping; air sac infection.	Symptoms; S.N. virus isolation.	Vaccination; good nursing.

*CRD & neural lymphomatosis see table 1 and 2.

New Developments In Swine Nutrition Of Interest To Veterinarians†

J. H. CONRAD,* B.S.A., M.S., Lafayette, Indiana

ANIMAL nutrition is a rapidly changing field just as is veterinary medicine. During recent years, there have been many new developments and changes in recommended feeding practices of all ages of swine. Swine nutrition problems indicate that it is to the practicing veterinarian's advantage to be well versed in recommended swine feeding practices and to keep abreast of new developments. Let us not lose sight of the fact that over 30% of the cash income from Indiana farms is from the sale of hogs. Veterinary practitioners are in an excellent position to aid the swine producer in improving swine sanitation and management practices as well as feeding practices.

Four major tropics will be discussed, based on research at Purdue University and at other experiment stations.

I. Antibiotics in Swine Nutrition

A. Nutritional Theories Concerning the Mode of Action of Antibiotics. (1) Aids in the synthesis of unknown nutrients. (2) Reduces toxic organisms in the intestinal tract. (3) Thins intestinal wall and improves nutrient absorption. (4) Improves overall health of animal by reducing subclinical infection.

B. Antibiotics and Reproduction. At Purdue 200 gilts in four experiments have been used to study the effects of antibiotics on birthweight, livability, and weaning weight of pigs. (1) Levels of chlortetracycline from 10-45 gm. per ton were fed throughout the gestation period. (2) No consistent effect was noted on the number of pigs farrowed, livability of pigs, percent of pigs weaned, or weaning weights. (3) The only consistent effect was 0.1 to 0.3 lb. heavier pigs at birth. (4) Therefore, the feeding of antibiotics during gestation is not recommended.

C. Antibiotics in Creep Feeds. (1) Increased gains of 10% and over. (2) Recommended level—40 gm. antibiotic per ton.

D. Antibiotics in Growing-Fattening Rations. A summary of 12 experiments conducted at Purdue with over 600 head of swine indicated that 10% increase in rate of gain and a 4% increase in feed efficiency. The increase in feed efficiency paid for the cost of the antibiotics. (1) Recommended levels: [a] Complete rations—10 to 15 gm. per ton; [b] protein supplement—50 gm. per ton. (2) High levels of antibiotics for "tail end" pigs: [a] Antibiotics have been fed at levels of 15 to 100 gm. per ton from weaning until animals reached 100 lb. weight. After pigs reached 100 lb., level of antibiotics fed was reduced to 15 gm. per ton. The antibiotic fed, the level of antibiotic fed, average daily gain, and percent increase in rate of gain are as follows: None, 0-0, 1.09, 0; aureomycin®[1], 15*-15**, 1.30, 11; aureomycin, 100-15, 1.51, 27; bacitracin, 100-15, 1.04, 0; penicillin, 100-15, 1.32, 14; terramycin®[2], 100-15, 1.55, 29. [b] Recommendation: Isolate poor doing "tail-end" pigs shortly after weaning, then feed 100 gm. of antibiotic per ton to 100 lb. and 15 gm. per ton thereafter.

II. Parakeratosis of Swine

A. Symptoms. The earliest detectable symptoms of parakeratosis are the presence of red, pimple-like areas on the abdomen and flanks. Shortly therafter, this is followed by keratotic or "crust-like" lesions on the skin of the legs in the region of the flank, pastern, and hock. Other areas showing early lesions are the nose, ear, tail, and sheath.

In severe cases, the entire body surface may be affected. The crusts of keratinous material are separated by cracks or crevices which often contain a sticky red-brown or black exudate. This exudate is often found on the abdomen and flanks early in the disease. These symptoms are accompanied by a reduced growth rate and a decrease in feed efficiency. Pigs with severe symptoms may stop growing completely.

B. Occurrence. Many different methods for transmission of this disease have been tried but all have failed.

†Presented at the 72nd Annual Convention of the Indiana Veterinary Medical Association, Indianapolis, Jan. 11-13, 1956.

*Department of Animal Husbandry, Purdue University.

®[1]Lederle Laboratories Div., Pearl River, N. Y.

®[2]Chas. Pfizer & Co., Brooklyn, N. Y.

*Level of antibiotic fed to 100 lb.

**Level of antibiotic fed from 100 lb. to market weight.

Wisconsin workers have reported an outbreak of parakeratosis when pigs were fed a ration of 84.5% corn, 11% soybean oil meal, 3.0% meat scraps, 1.0% limestone, and 0.5% salt. This is normally considered a good balanced ration.

Purdue workers have produced parakeratosis experimentally with pigs fed 1% of calcium in a purified diet.

C. Treatment. The recommended treatment is a reduction in the calcium content of the diet accompanied by the addition of zinc. Wisconsin workers have suggested the addition of 0.4 lb. of zinc carbonate or 0.9 lb. of zinc sulfate per ton of feed. Pigs exhibiting symptoms of parakeratosis can be expected to show a response to zinc treatments within three to five days.

III. Experimentally Produced Salt Poisoning

A. Is There Such a Thing as Salt Poisoning of Hogs? This controversy has been going on for some time between the swine researcher and the practicing veterinarian. At Purdue, Vestal[8] produced salt starved hogs by omitting salt from the diet for 140 days. At the end of this time the hogs were given access to loose salt, brine, or salt water. Most ate from 1 to 1¾ oz. of salt in 48 hours. However, one ate 9 and another 6 oz. All hogs refused to drink the brine or salt water. Some scouring occurred but no other abnormal symptoms were observed. Negative results were also obtained by Wisconsin workers at that time.

Bohstedt and Grummer[9] published an article entitled, Salt Poisoning of Hogs. The pigs used in this experiment were conditioned as follows: 1. They were starved for several months. 2. They were fed slop. 3. Insufficient trough space was provided (competition). 4. Salt was added at 1.5 to 2% by weight of the slop. Some pigs received as much as 3½ oz. of salt per day. 5. No additional drinking water was provided. 6. More than one day on excessive salt feeding was required before symptoms of salt poisoning became evident.

The autopsy report on animals that died or were sacrificed on this salt feeding experiment indicated the following:

B. Symptoms. The most marked symptoms involved the nervous system with staggering, marked weakness, paresis, and paralysis of the hind parts or general paralysis predominating.

C. External Appearance. The first three animals autopsied were comatose in a lateral recumbent position. Clonic spasms of the legs were evident and abrasions on the dependent portion of the legs existed from contact with the cement floor.

D. Heart. Slight increase in the amount of fluid in the pericardial sac. Hearts were flabby and atonic.

E. Liver. The livers of all animals were extremely pale and yellow, suggesting anemia and fatty changes. They were friable and few ecchymotic hemorrhages were observed beneath the capsule.

F. Diagnosis. From the history and symptoms the cause of the condition was undoubtedly due to the toxicity of sodium chloride (NaCl), or the stress exerted by a change of concentration of salt. It has been reported that the cause of the nervous symptoms is the depressant action of the sodium ion on the central nervous system. The only gross anatomical change attributable to the experiments appeared to be changes in the liver.

G. Summary. The authors concluded, "We have a first recorded instance where it has been possible to salt-poison pigs experimentally."

If the conditions as outlined above happen to occur on certain Indiana farms it would seem possible that salt-poisoning could occur. However, since it has been difficult to produce salt-poisoning experimentally and since the extreme conditions necessary to produce symptoms seldom occur under farm conditions, it should be emphasized that "salt-poisoning" of hogs is unlikely to occur on Indiana farms.

IV. Protein Requirements of Swine

Proteins are the most important and most critical of all nutrients required by swine. Research at Purdue and Cornell has shown that ten amino acids (building blocks of protein) are essential for the pig and must be supplied in the diet in proper amounts. However, in feeding recommendations, the level of protein is still used as an indication of the essential amino acids required by the pig.

A. Protein requirements of swine. The protein recommendation for different ages of swine can best be met by mixing corn and oats with the protein supplement or by feeding free choice corn and supplement. However, it should be remembered that the present day protein supplement is not only a source of protein and amino acids, but is also a carrier of essential vitamins, minerals, and antibiotics.

To best illustrate the importance of adequate protein in the diet of the pig, what would be

Table 1.

Age or Weight of Pig	% Protein Drylot	Pasture
Early weaned pigs	24-24	—
Creep feeds	18	—
50 lb.	16	14
100 lb.	14	12
150 lb.	13	11
200 lb.	12	10
Gilts—gestation	15	—
lactation	15	—
Sows—gestation	14	—
lactation	14	—

the result of feeding a ration complete in all nutrients except one essential amino acid? Purdue research has shown that if a weanling pig is fed all nutrients and essential amino acids except lysine it will actually lose weight—2 lb. in 28 days. The pig fed lysine gained 25 lb. in 28 days. The same is true of tryptophan. Beeson, *et al.*[2] reported that pigs fed no tryptophan lost 8 lb. in 21 days while those fed adequate trytophan gained 25.5 lb. during the same period. The response to the deletion of one essential amino acid from the diet of the pig is immediate. There is no carry-over effect.

Pigs on low lysine and trypophan diets exhibited the following symptoms: Rough hair coat, dry skin, depraved appetite, failure to gain, and lowered feed intake. These are typical of young pigs on a low protein diet or on a diet deficient in one essential amino acid.

Corn and oats, the major swine feeds, are low in protein and the essential amino acids, especially lysine and trytophan. Occasionally, the practicing veterinarian will prescribe oats plus medical treatment for two weeks following weaning and vaccination for cholera or he will prescribe a change of feed and no protein supplement for a week or two. In my opinion, a feeding recommendation of this type is detrimental to young pigs. If there is a need to reduce the feed intake, it is recommended that a completely balanced ration be prescribed. Such balanced ration, adequate in protein, vitamins, and minerals, can then be hand-fed at the desired level.

Remember, when you prescribe medical treatment and a change of feed be sure it is in agreement with good swine nutrition practice.

REFERENCES

1. Beeson, W. M., Crampton, E. W., Cunba, T. J., Ellis, N. R. and Luecke, R. W., Nutrient Requirements for Swine II. No. 295. National Research Council, 2101 Constitution Avenue, N. W., Washington, D. C., 1953.

2. Beeson, W. M., Mertz, E. T., and Shelton, D. C., The Effect of Tryptophan Deficiency on the Pig. *Jour. An. Sci.*, 1949.

3. Bohstedt, G., and Grummer, R. H., Salt Poisoning of Hogs. *Jour. An. Sci.*, 13:931, 1954.

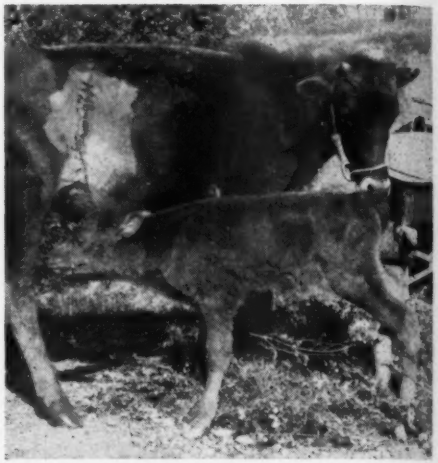
4. Conrad, J. H., and Beeson, W. M., 35th Annual Purdue Swine Day Report. An Husb. Dept., Purdue University, 1955.

6. Vestal, C. M., Prevent Salt Hunger in Hogs. A. H. Mineo. 23., Purdue University, 1947.

▼ ▼ ▼

Early Fecundity in a Heifer

The accompanying photo was supplied by Dr. Don. R. Goodwin, El Dorado, Ark. depicting an unusual case of early fecundity in a Jersey heifer. Size of the dam may be compared to the wheelbarrow in the right background.



Doctor Goodwin wrote that records indicate the heifer was 12 months and 20 days of age, when the owner delivered her to the Goodwin Veterinary Hospital. Height of the patient was 40 in., weight 150 lb. Calf delivered by cesarian section at full term (279 days) weighed 24 lb. The owner advised that the heifer was bred when three months of age by an Angus bull. At that time the heifer was small enough to walk under the bull for service. The bull bred the heifer without mounting, retaining all feet on the ground during intromission.

The dam made an uneventful recovery and both dam and calf are in excellent condition at this writing (July 18, 1956).

It is believed that this case establishes a record for early calving.

▼ ▼ ▼

If you must kick a hog, take off your shoe—it's cheaper, advises Livestock Conservation, Inc. Injuries to hams and bells account for 50% or more of the estimated $5,000,000. national annual loss due to bruises of hog carcasses during marketing operations.

Clinical Use Of A New Nitrofuran Dosage Form In The Retained Placenta Syndrome In Cattle

S. V. JONES, D.V.M., G.B. BELLOFF, V.M.D., and
H. D. B. ROBERTS, V.M.D., Norwich, New York

DESPITE modern antibacterial drugs, the retained placenta syndrome in cows continues to be a therapeutic problem. The increase in species of pathogenic bacteria resistant to sulfonamides and antibiotics is probably one of the causes of therapeutic failures in many cases initially routine, uncomplicated retention of fetal membranes. Endometritis often follows, with its all too common sequelae: Impaired fertility and decreased milk production, septicemia, mastitis, or ketosis may compound the problem in some animals, despite what appears to be adequate treatment with modern antibacterials. In this intensive dairy farming area of central New York state, such a course of events is not unfamiliar; being apparently on the increase in recent years. Since the writers have had uniformly favorable results recently with a new medicinal treatment, we feel that our experiences may be of interest to other practitioners confronted with similar problems.

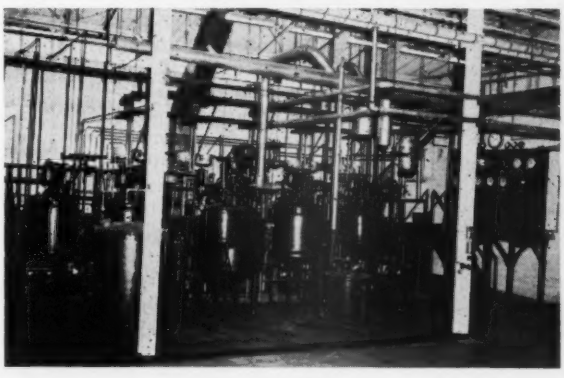
During the past 12 months, a new drug combination has been under study formulated specifically for prophylaxis and therapy of uterine infections in cattle. The new agent has been designated furea*, containing 1.45% micropulverized nitrofurazone, N.F. (furacin®) and 98.55% powdered crystalline urea. In this study, 3 gm. furea compressed tablets were used. Recently, this medication has become available as 12-gm. boluses.

*Furea (Trademark) Veterinary. Manufactured by Eaton Laboratories, Norwich, New York.
®Eaton Laboratories, Norwich, N. Y.

Clinical Experiences

When experimental supplies of furea were first made available for field tests, a cautious attitude was taken. The first two cases received concomitant treatment with sulfonamides and acriflavine (case 1 and 2). However, results obtained in these two cows were better than anticipated so that it was decided to use furea alone in later cases presented. It was also found that the combined agents were free of any possible toxic or irritating properties. In several cases, up to 24 gm. have been inserted at one time in one uterine horn, without the slightest sign of any harmful effect being noted by the owner or attending veterinarians. On the contrary, rapid decrease in malodor, drainage, and other symptoms of infection, was observed in virtually all cases after treatment. Records are now complete on approximately 150 cases treated with consistently excellent results, fully solidifying early impressions of the efficiency of the new agent. Fertility follow-up data are now available for the first 15 cows treated.

For clarity, cases are summarized in tabular form. All cows were examined during 1955 on dairy farms in the vicinity of Norwich. Cow 1 had complete uterine eversion ten days prior



Fif. 1. Partial view of the manufacturing installations used in the synthesis of furacin® (nitrofurazone N. F.).

to therapy; all others had retention of placenta of at least 24 hours duration. Except for cows 13 and 14, respectively Jersey and Guernsey, all others were Holstein Friesian.

Discussion

The management of the retained placenta syndrome must necessarily be somewhat individualized, as the consistency of the afterbirth and the ease of manual removal may vary considerably. Wherever manual removal fails when the cow is first seen, 90 days' sexual rest is routinely prescribed. However, effective antibacterial treatment is of great value in all cases.

The results obtained with furea appeared to be far superior than could be obtained with other medication. The 15 cases tabulated represent an unselected successive group, and the good results in this series parallel those oberved in all others treated. The beneficial action was most apparent in cases where initial attempts at manual removal were unsuccessful (cows 3, 7, 12, 14, and 15). Excellent results were obtained in one case of septic metritis, where the animal was feverish and off feed (cow 9). In nearly all cases treated, the general condition improved rapidly. The lack of malodor was also quite prominent, and drew spontaneous commendations from owners in a number of cases. Except for cow 13, which could not be followed up, the effectiveness of furea has now been confirmed by the unimpaired fertility in all cows but no. 10. We doubt that any antibacterial drug would have given better results in this animal or the others.

The antibacterial ingredient used, furacin, is one of the synthetic nitrofurans whose antimicrobial action was first reported in 1944[1]. Its action differs qualitatively from that of antibiotics and sulfonamides, and pathogenic organisms which have become resistant to the latter two classes of drugs remain susceptible to furacin. The drug is harmless in therapeutic concentration upon topical application to mammalian tissues and does not inhibit phagocytosis or delay healing or epithelization in wounds[2, 3]. It remains antibacterial in the presence of pus, serum, or organic detritus, and is effective against most Gram-negative and Gram-positive groups of pathogenic bacteria, being used widely for topical antibacterial therapy in human medicine. In veterinary practice, it is also available on prescription in a variety of dosage forms, and good results have been reported with it in many common infectious conditions in small and large animals.

The use of furacin in bovine genital infec-

Cow no.	Age	Duration of retention (Hr.)	Quantity of Furea into uterus; other treatment	Pregnancy Examination following therapy	Comment
1	5	—	12 gm. and (96 hr. later) 12 gm. 250 cc. sulsulfamethazine and 250 cc. of 0.1% acriflavine sol.	Positive	Discharge ceased in 4 days. 3 months' sexual rest prescribed.
2	5	24	12 gm. and (96 hr. later) 12 gm. 250 cc. sulfamethazine and 250 cc. of 0.1% acriflavine sol.	Positive	Drainage ceased in 7 days. 3 months' sexual rest.
3	5	48	9 gm. in each horn	Positive	Manual removal failed. Membranes expelled on the 4th day. Appetite and condition excellent throughout.
4	6	24	(After manual removal) 9 gm. in gravid and 3 gm. in nongravid horn.	Positive	Cow in good condition throughout; virtually no malodor.
5	7	24	(After manual removal) 9 gm. in gravid and 3 gm. in nongravid horn	Positive	Good condition throughout; notable absence of malodor.
6	6	48	(After manual removal) 9 gm. in gravid and 3 gm. in nongravid horn	Positive	Good condition throughout, notable absence of malodor.
7	4	24	12 gm.	Positive	Manual removal failed. Membranes passed on 5th day. Good condition, no malodor.
8	7	24	(After manual removal) 9 gm. in gravid and 3 gm. in nongravid horn	Positive	Noticeable absence of malodor.
9	6	24	18 gm.; penicillin (1 million U.) i.m.; 20 cc. pyribenzamine subcut.; estrone 100,000 U.; 12 gm. furea following m.r. 48 hours later	Positive	Septic metritis. Rapid recovery, very little malodor. 3 months sexual rest advised.

10	2	24	12 gm. repeated in 48 hours	No estrus	Manual removal failed. 48 hrs. later, placenta half free but cervix too contracted for removal. Almost no malodor. Decrease in appetite and milk—endometritis.
11	2	24	(After manual removal) 9 gm. into gravid, 3 gm. in nongravid horn	Positive	Good condition throughout.
12	6	48	18 gm.	Positive	Manual removal failed, but was easy 48 hours later. Remarkable lack of malodor.
13	5	24	(After manual removal) 9 gm. in each horn.	(No follow-up, animal sold 4 days later)	No untoward symptoms.
14	7	24	18 gm.	Positive	Manual removal failed. Noticeable lack of malodor, good condition throughout.
15	6	24	18 gm.	Positive	Manual removal failed. No untoward symptoms, virtually no malodor.

tions including conditions such as granular vaginitis[4], and postservice as intrauterine infusion[5, 6] or by insertion of prepared suppositories into the os cervix[7]. Schaffer also reported favorably on the use of suppositories in genital infections in various animals, including ten cases of retained placenta in the cow[8].

Although it is probable that the effectiveness of furea tablets is due primarily to the antibacterial properties of furacin, it is felt that the addition of urea has definite advantage. The proteolytic and topical debriding action of urea[9] has been known for over 50 years, although topical use in medicine lagged for several decades, and until a number of favorable reports appeared on its use in wounds, stressing especially its deodorizing properties and absolute lack of toxicity[10]. Because the actual antibacterial activity of urea is low at best, many products containing combinations of urea with various other antibacterials have been suggested and marketed, especially with sulfonamides. Unfortunately, the activity of these preparations is somewhat limited by the frequency of sulfonamide-resistant bacteria and the inhibitory effect of organic debris. For this reason, less has been made of these drug combinations containing sulfonamides although they may occasionally give excellent results. The economic considerations in cattle practice, especially in affections commonly threatening fertility and productivity, effectively restrict our choice of medication to those that prove most uniformly effective. From limited experience reported herein, it must be concluded that this medication is a valuable, practical, and effective adjunct in the professional management of retained placenta in the cow.

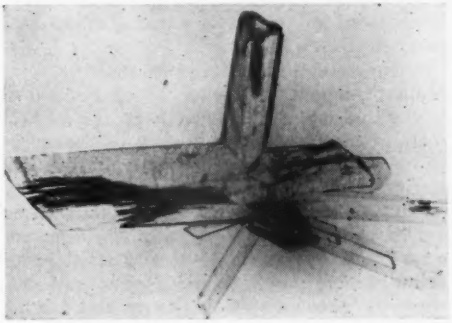


Fig. 2. Crystals of furacin® (nitrofurazone N. F.).

Summary

The intrauterine insertion of furea veterinary, containing furacin and urea, effectively prevents endometritis and other untoward sequelae following retained bovine placenta. Furea intrauterine usually produces rapid cessation of malodor, discharge and other signs of infection. The medication is nonirritating and has been used by us in about 150 cases to date. One series of 15 cows treated is described in detail, and effectiveness was confirmed by pregnancy examinations after treatment. Some therapeutic problems in the management of bovine uterine infections are discussed, reviewing briefly the role of furacin and urea as antibacterial medications in bovine genital infections.

REFERENCES

1. Dodd, M. C., and Stillman, W. B., The In Vitro Bacteriostatic Action of Some Simple Furan Derivatives, *Jour. Pharm. Exp. Therap.*, 82:11 (Sept.), 1944.

2. Snyder, M. L., Kiehn, C. L., and Christopherson, J.W., Effectiveness of a Nitrofuran in the Treatment of Infected Wounds. I. Preliminary Report. *Mil. Surgeon*, 97:380 (Nov.), 1945.

(Continued on page 440)

Some Complications Incidental To Swine Production†

R. F. BAKER,* D.V.M., Fort Dodge, Iowa

DISEASE may not be the basic factor responsible for all unprofitable swine production. Sometimes mismanagement has limited the potential for lower production costs. Veterinarians are conscious of these matters since they are of vital concern in medical management.

Some anatomical features of modern swine are not conducive to health. The heavy animal with short legs and arched back moves normally with anal and respiratory orifices close to the soil, and is thus intimate with soil contaminates. The revolution in swine breeding for leaner types must be undertaken with an eye toward stronger, not weaker structure; nor can disease resistance be sacrifice for faster gains economically. Swine diseases have become complicated as management and feeding practices have improved to add stress to production and reproduction.

Baby Pigs

In spite of all effort to do a superior job, one-fourth of pigs farrowed are never weaned. This does not consider violent epidemic of specific diseases to which the newborn are particularly susceptible. In such instances losses may be even more acute. That the industry of swine culture could continue or survive under such staggering loss experience is unprecedented. Causes of losses are varied. Those most frequently responsible are:

Overlaying by Sows. Some authorities claim that 48% of losses during the first few weeks after farrowing are due to overlaying by sows. Considering aids furnished by agricultural engineering some of these losses are unexcusable and certainly preventable. Those losses not attributed to design of pens allowed for farrowing may be associated with blind, deaf, awkward, or otherwise unsatisfactory sows. These matters are purely husbandry considerations but the practitioner can render a genuine service to growers by encouraging acceptable methods and provision for maximum employment of aids and selection of breeding stock. It is a personal opinion that he has a responsibility to do so.

Unthriftiness. Twenty-two per cent of early pig losses result from unthriftness. Causes are attributed to lack of vigor in breeding stock and to faulty practices of some husbandrymen. Included in this group are:

(1) Crowding in small pens with small exit doors.

(2) Improper feed and lack of execise.

(3) Genetic anomalies, such as cleft palate, hernia, lameness, imperforate anus.

(4) Inverted nipples in sow, disposition of sows, and uncomfortable drafty quarters.

Starvation. Approximately 8% of total losses are claimed to be due to starvation. Hormone imbalance, overfeeding immediately prior to farrowing, insufficient exercise during gestation, dystocia, and metritis all contribute to agalactia. Included also in this group are pigs commonly referred to as "jitter-bugs," a nervous affectation that prevents normal nursing.

Injection of posterior pituitrin with provision for proper feed and care will relieve the majority of conditions that result in starved pigs. Others that may be complicated by metritis, constipation, or mammitis require supplementary therapy. Diethystilbestrol, penicillin, and posterior pituitary extract are recommended for relief of symptoms of metritis, Epsom salts and enemas for constipation, lentin® (2-5 cc.) for overloaded stomachs, and penicillin and posterior pituitary extract for mammitis. Treatment must be prompt. If prolonged, pigs succumb.

Ketosis. Entire litters are lost due to ketosis of sows. Loss of condition, arched back attitude, and "sore-mouth-like" symptoms characterize ketosis in sows. Intravenous administration of fructose-dextrose solutions, parenteral cortisone and inclusion of molasses in the rations are recommended.

Sow Hysteria. Unexplained hysteria of sows accompanied by cannibalism often may be controlled satisfactorily by intravenous injection of posterior pituitary extract, and if indicated, intramuscular injections of pentobarbital. The newer tranquilizing drugs may serve here. In this and other abnormal condition of sows it may be desirable to separate

†Presented at the 72nd annual convention of the Indiana Veterinary Medical Association, Indianapolis, Jan. 11-13, 1956.

*Ft. Dodge Laboratories.

®Winthrop Laboratories, New York, N. Y.

pigs and feed a suitable starter, or if the condition is delayed after farrowing, creep feeding should be started as soon as possible.

Affectations Common to the Nursing Period

Allergy to Dam's Milk. Vomiting and scouring of pigs characterize allergy to dam's milk. Supplemental feeding or removing pigs to starter pens is necessary to avoid losses. Antihistamines have been used with some success in both sows and pigs. These females should be culled from the breeding stock.

Transmissible Gastroenteritis (Baby Pig Disease). This virus disease that has decimated droves of baby pigs is extremely contagious. Mortality declines percentage-wise as age increases. It is initiated by sudden onset and elevated body temperature, followed by diarrhea and vomiting. The disease has plagued the profession for years because of lack of understanding of its cause and because various treatments applied were ineffective largely. Contagiousness was demonstrated at the Purdue station—no matter how strict the isolation, whenever a case occurred in a farrowing house all pigs acquired the disease.

Some success has been reported by the administration of nicotinic acid or large doses of vitamin B complex with bismuth preparations and sulfonamides. Antibiotics have been employed as additional therapy. In my experience the condition appears to be associated with wet, cold weather and damp uncomfortable bedding. Recovered animals appear to be immune. The infectious agent does not appear to survive on premises from one farrowing season to the next.

Dietary Scours. Dietary scours or nutritional enteritis is common throughout the hog growing regions. Check rations and prescribe a bland diet. One may prescribe 1 lb. of sodium bicarbonate to 5 gal. of slop-feed. Methanamine is also prescribed to be added to the drinking water or slop. Large doses of vitamins B complex may be selected as supplemental therapy.

Infectious Scours. The whitish to grayish copious scours of pigs often appears when sows farrow on lush succulent clover pasture or, at other times, when farrowing pens are unsanitary, damp, and drafty. If on dry lot, sows are given a light laxative diet and individually treated with sulfonamides, antibiotics, and bismuth. Do not neglect aftercare.

Anemia. The common symptoms of pig anemia are of special significance and consideration for providing prophylactic measures should never be neglected. Regardless of general appearance of either spring or fall litters preventive antianemic treatment is recommended. One of several treatments may be employed—preferred is individual treatment of pigs with therapeutic mixtures commercially available in suitable dispensing packages.

Streptococcic Dermatitis. Rather extensive lesions often develop following wounds inflicted by pigs of litter mates. Fighting may occur because of insufficient milk. Bacteremia may develop in severe cases resulting in death. Culture of lesion reveal streptococcus which is susceptible to antibiotics. Response to individual treatment, if not too long delayed, is satisfactory.

Atrophic Rhinitis. Atrophic rhinitis in pigs may occur as early as three weeks of age. Sneezing is suspicious of infection with or without discharge of bloody exudates from the nostrils. All animals infected do not develop apparent anatomical deformities of the snout. Some degree of success has been reported following injections of streptomycin. Isolation and culling are soundest recommendations for control.

Erysipelas. Erysipelas may pose serious diagnostic difficulties, particularly in its septicemic form. Lameness, sloughing of ears and tails, and swollen joint (hock) are suggestive of infection. Laboratory assistance in diagnosis is recommended. Navel infections manifested as joint ills must be differentiated.

In event a diagnosis of erysipelas is substantiated, antiserum and antibiotics are given promptly. This treatment is followed after a few days with erysipelas bacterin which is repeated in eight to ten weeks if indicated. When diagnosed on a farm it is advisable to plan a definite program which includes the use of bacterin on all brood sows at about four weeks prior to farrowing. This will suffice to confer some postnatal protection for pigs.

Virus Pericarditis. A severe dehydration with symptoms of dyspnea suggest a condition referred to as interstitial pericarditis with increased fluid in the pericardial sac. The condition has been reported accompanied by pneumonia. This has not been typical in Illinois.

Litter (Bedding) Infection. Irritation to the unsealed navel stump or any site of inflammation may be of sufficient severity to establish local infection, or septicemia. Abscesses, dermatitis, keratitis, and other manifestations of infection may develop followed in some instances by suppurative arthritis. A similar syndrome has been reported in pigs on pastures of certain clover species, rape, and buckwheat.

Parakeratosis. Affected animals were formerly referred to as "greasy pigs." Recent revealing research has explained etiology to be a zinc deficiency or imbalance of calcium. This theory has been widely accepted. Certain dermatoses and/or fungus infections must be differentiated.

Parasites. The parasitic problem is a universal and always present one. Unthriftiness resulting from subclinical infections are probably most important economically but death losses are significant. Selection of satisfactory anthelmintics, of which a number are now commercially available, and recommendations for effective control measures are medical problems. Devastating losses due to parasitism are most likely to occur in pigs under four months of age.

Enterotoxemia. The condition formerly referred to as gut edema is a relative newcomer to the list of diseases of baby pigs. The disease may occur in any age group of swine. Outbreaks have been observed in individual sows and gilts brought to new premises without disease history and drove of origin that are unquestionably clean. Shoats display symptoms often mistaken for cholera. Severe conjunctivitis, edema of the eyelids, fleabitten appearance of skin of the legs, flank, and ventral body surface, and encephalatic symptoms are often progressive. In other cases disease appears to be self-limiting.

Autopsy lesions are variable. They range from petechiation to diffuse hemorrhage of various vital organs. Intestines develop a peculiar sheen, purplish cast, and appear filled with gas. Stomach (greater curvature) is frequently reddened, and often with thickened walls. Peritoneal fluid is excessive and straw colored. It becomes gelatinous on exposure to air.

Cause is unconfirmed. A virus etiology has been proposed though bacteria of several species have been incriminated.

Treatment with oral Glaubers of Epsom salts has proved useful. Good nursing is to be commended. Injections of vitamin B complex has proved helpful in some cases.

Leptospirosis. Abortion in late pregnancy characterize outbreaks of leptospirosis. Contagiousness is evident. Pig mortality ranges from 40 to 95%; majority succumb during the first few days of life. Older pigs exhibit symptoms of meningitis (nervous spasms-circling) and become unthrifty. Infection is probably much more prevalent than believed earlier. It was a startling revelation to note that one test covering a section of the Corn Belt gave positive serum agglutination test results in 28-30% of the cases tested.

Vaccination has field supporters at this writing. Recovered swine develop a carrier state although these animals appear to be immune to future attacks. Large doses of broad-spectrum antibiotics appear to be of aid in treatment.

Variola Pox. Severe infection causes serious losses. Look for insect vectors of the causative virus to reduce spreading.

Eperythrozoonosis. The blood parasitic disease is manifested as an acute hemolytic anemia with varying degrees of icterus. Splenic enlargement is a common autopsy lesion. Clinical signs of eperythrozoonosis may be present in 10% of the herd while the remainder are symptomless subclinical infection. Imposed stress of treatment such as dosing with an anthelmintic or vaccination during a siege of this condition may prove serious. Flies are claimed to be insect vectors.

Sodium arsphenamine (0.25 mg./lb.) intraperitoneally has proved satisfactory in our hand for treatment. A suitable arsenical may be added to drinking water for several days after individual treatment.

Summary

No consideration has been given either hog cholera or salmonellosis, both of which are important diseases of baby and growing-fattening pigs. Other abnormal conditions might have been included but for the most part are of lesser importance than those mentioned. It should be emphasized that the list of anomalies has multiplied during recent years and new diseases are continually posing threat of loss. It appears imperative that if the culture of swine is to survive in a competitive meat market, disease losses must be limited to maintain the industry on a sound economic basis.

▼ ▼ ▼

Arteriosclerosis in Animal Species

Lindsay, pathologist in the University of California School of Medicine, has reported that he has found arteriosclerosis in such diverse species as dogs, cats, elephants, lions, tigers, cows, horses, apes, et cetera. The conditions starts as fatty deposit, though these did not appear to play a role as a cause of death; the latter being due to mucoid lesions. Taken as a whole the condition gradually worsened with the aging process.—*R. R. Dykstra, D.V.M.*

Practical Laboratory Procedures For The Practitioner†

JAMES W. NEWBERNE*, D.V.M., M.S., Lionsville, Indiana

THE economy-minded clinician is constantly confronted with the problem of selecting diagnostic procedure which will provide a maximum of useable information together with the greatest economy of time. Wherever possible, a routine sequence in the examination of a patient, including certain pertinent laboratory tests, might well afford a practical approach to this problem.

In order that the results of laboratory tests performed on a given animal be intelligently interpreted, they must be correlated with the history and symptoms exhibited by that animal. Following a thorough physical examination, certain selected screening procedures offer immediate valuable diagnostic and prognostic aid, and perhaps serve to indicate the need for other more specific procedures.

The purpose of this paper is to suggest and briefly discuss several screening procedures which might be readily adapted to practically any veterinary practice. The details of the various procedures described here may be found in any one of several standard laboratory manuals [1, 2, 3, 4].

Parasitological Procedures

A laboratory procedure currently conducted by practically all clinicians is some type of examination for parasites, both external and internal. Most of the external forms are visible grossly. Those microscopic forms which occur in or on the skin may be demonstrated by simple skin scrapings placed on a clean dry slide and macerated by adding a few drops of 5 or 10% potassium or sodium hydroxide. A cover slip should be applied and the preparation allowed to stand 20 to 30 minutes before examination. Some of the parasitic fungi, such as those causing ringworm, cutaneous blastomycosis, and others, may be similarly demonstrated.

Methods currently used for determining the presence of internal parasites are numerous and varied. One proved method is that of examining fresh fecal-saline smear preparations, followed by one of the several flotation methods if warranted. Inasmuch as most flotation solutions tend to disintegrate the trophozoite stages of the protozoal parasites, it is probably advisable to routinely examine saline smear preparations either before or concurrently with, a specimen prepared by a flotation method. Normal physiological saline is preferred for fresh smear preparations. A suitable flotation medium is a 33% solution (weight-volume) of zinc sulfate. This solution has an advantage of not being sticky, as certain sugar solutions are, nor does it corrode metal equipment as do various salt solutions. Since it is now known that the canine heartworm, *Dirofilaria immitis*, is much more widespread than formerly believed, it is perhaps advisable to examine for the larval stage of microfilaria by mixing a drop of freshly drawn venous blood with a drop of normal saline and examining with the microscope. The low power objective provides satisfactory magnification for this observation.

Urinalysis

For practical purposes the more common conditions which may produce abnormal urinary constituents are: (1) Abnormalities of organs outside the urinary tract, and (2) abnormalities of the urinary tract proper. Included in the former are conditions such as hepatic damage or bile flow obstruction which is usually reflected by bilirubinuria. By contrast, hemolytic jaundice does not as a rule result in bilirubinuria. Acute pancreatitis may result in glycosuria. Persistent glycosuria is usually indicative of insulin deficiency, and the resultant syndrome, diabetes mellitus. Diabetes insipidis, which is caused by pituitary dysfunction and which at times may mimic symptoms of diabetes mellitus, may be differentiated from the latter by the absence of glycosuria.

Nephritis in one form or another is probably the most important single entity among common urinary trace disorders. The state of urine is helpful in determining whether nephritis is acute or chronic and thereby indicating

---

†Presented at the 72nd Annual Convention of the Indiana Veterinary Medical Association, Indianapolis, Jan. 11-13, 1956.

*Pathology Research Laboratory, Pitman-Moore Company.

an appropriate line of therapy. The following tables serves to illustrate the more consistent findings in the two types:

Test	Acute	Chronic
Volume	Decreased	Increased
Color	High	Pale yellow
Specific gravity	High	Low
Protein	High	Traces
Sediment	Vary amounts of epithelium, casts, inflammatory cells, r.b.c., etc.	Negligible

It is at times rather difficult to differentiate between the acute type of nephritis, ureteritis, cystitis, urethritis, and prostatitis. Examination of stained urinary sediment may prove helpful, and a test for blood urea nitrogen will usually indicate whether the kidney is involved. It is well to remember that in most cases of terminal chronic nephritis there is exacerbation which tends to simulate those findings usually associated with acute nephritis. Correlation of laboratory results with the history and clinical symptoms will usually serve to indicate an appropriate line of supportive treatment. When acute nephritis is suspected, efforts should be directed toward neutralizing the retained toxic elements of the blood and lessening the renal load by the administration of normal saline. Whole blood in any quantity would be contraindicated since this substance would tend to increase the burden of the overtaxed kidney. Temporary supportive treatment might similarly be instituted for other apparent disorders of the urinary tract.

Hematology

The particular pattern that blood pictures assume during various stages of many diseases afford considerable aid in formulating a diagnosis and a subsequent prognosis.

Leukocytes. In general, bacterial infections stimulate an increase in total leukocyte count with an increased percentage of young forms of neutrophils which constitutes a "shift to the left." These changes, when occuring in reasonable proportions, indicates a favorable response of the bone marrow. By contrast, viral infections depress the total leukocyte count.

Certain noninfectious conditions such as hepatitis with nitrogen retention, certain malignancies and acute hemorrhage also affect the total and differential leukocyte picture in a manner quite similar to that of a bacterial infection. Eosinophilia is often present in certain allergies as well as in several parasitic infections in which the parasites invade the tissues. Persistent monocytosis quite often suggests the presence of a chronic, inflammatory granulomatous process.

Erythrocytes. Determination of the packed cell volume, using a Wintrob hematocrit tube, may serve to indicate the extent of anemia in most cases. When it is desired to specifically identify the type of anemia present then the erythrocyte count and hemoglobin determination are also necessary[5].

The Wintrob hematocrit tube is also useful in further microscopic study of the blood. The items of equipment necessary for carrying out the hematocrit test are: (1) An erythrocyte sedimentation correction chart, (2) a special capillary loading pipette, and (3) a clinical centrifuge capable of spinning at 3,000 r.p.m. Four important determinations may be made by this method. These are: (1) Sedimentation rate: In systemic inflammatory diseases and conditions that lead to extensive tissue damage the sedimentation rate is increased. (2) Packed red cell volume: Indicates the extent of anemia. (3) Icterus index: Indicates bilirubinemia. (4) Buffy coat: This is the thin zone of leukocytes and platelets found between the packed red cells and the plasma. One millimeter of buffy coat roughly approximates 8-12,000 leukocytes cm.

Blood Chemistry

A number of chemical analyses are readily adaptable to routine veterinary practice. Two of the most important of these are: (1) The Hench-Aldrich Method* for determining blood urea, and (2) the bromsulfalein test* for liver function. In general, elevated blood urea is attributable to some form of renal dysfunction which results in retention of this compound. The bromsulfalein test affords a fairly efficient method of measuring liver function. Both of these tests are extremely simple to perform and remarkably accurate when properly carried out.

It should be emphasized again that the procedures mentioned here are screening procedures and may serve a useful purpose in that capacity. If the clinician has a clear understanding of the basic changes which may be expected to occur in various disease conditions as well as the ability to correlate history, symptoms, and laboratory results, then the problem

(Continued on page 422)

*Small kits containing all necessary reagents and complete instructions for performing these tests are manufactured by the LaMotte Chemical Co., Baltimore, Md.

Seborrhea Oleosa in Pigs†

M. RISTIC, D.V.M., Dipl Vet., M.S., D. A. SANDERS, B.S., D.V.M., H. D. WALLACE, Ph.D., Gainsville, Florida

Seborrhea oleosa or "greasy pig disease" is a chronic noninflammatory affliction of suckling pigs, characterized by large, dark, waxy, scale-like crusts and sheet lesions of the skin. In mild cases, lesions may be confined to the skin of the axillary region, lateral and abdominal body wall and the back, whereas in severe cases practically the entire body surface may be affected. Kernkamp[1, 2] described the disease affecting swine in Minnesota.

The present report records seborrhea oleosa as observed in nursing pigs on several Florida farms, together with transmission experiments and treatments attempted. A total of 41 nursing pigs between six days and four weeks of age, distributed among six litters, exhibited various degrees of dermatitis. The animals were raised on dry lots, the sows being provided with a ration consisting of corn and peanut meal supplemented with minerals, vitamins, and aureomycin.

Symptoms

The earliest detectable symptoms were appearance of reddish, scale-like crusts and large symmetrical flakes on the abdominal walls, cervical region, around the nares and ears[1, 2, 3]. The skin beneath affected areas revealed accumulation of an oily, wax-like material. Mechanical removal of the waxy layer exposed a reddish-oily skin of complete alopecia, having an unpleasant, rancid odor. In early stages of the disease there was no apparent irritation, but often when the waxy crust became desquamated, affected animals would rub and scratch. Severe cases revealed marked depression in appetite and growth rate and the vision of these animals was greatly impaired due to lesions of the ocular area. The general physical condition became poor and the majority of these cases terminated fatally between the second and third week of the disease.

Differential Diagnosis

None of the affected animals showed elevation of temperature and no bacterial growth from their blood samples was obtained on blood agar plates. With exception of slight anemia, no other macroscopic changes were observed at autopsy. Several of the affected animals showed a low hemoglobin level and red-cells count. Skin scrapings were examined microscopically for dermal parasites, while Sabouraud's dextrose agar plates were inoculated for possible isolation of pathogenic fungi. There was no indication of either type of infection.

Fig. 1. Seborrhea oleosa in a nursing pig, characterized by waxy crust-like lesions of the ear.

Fig. 2. Scale-like dermatitis of seborrhea oleosa in a pig, confined to the skin of the ventral abdominal region.

Treatment of several affected animals by use of topical application of benzene hexachloride and other remedies, failed to give any appreciable relief. Attempts to transmit the disease to healthy pigs of similar age by means of contact and inoculations of spleen, lymph node, and liver tissue suspensions were unsuccessful. Parakeratosis is reported to be rarely observed in pigs younger than two months. Accelerated keratinization as evidenced by deposits of keratinous crusts on the skin surface, is pathognomonic for parakeratosis. Furthermore, in parakeratosis, crusts are not greasy and underlying layers are dry except when exudation occurs due to secondary infection.

†From the Department of Veterinary Science, University of Florida, Agricultural Experiment Station.

Fig. 3. A severe case of seborrhea oleosa in a pig, affecting the skin of practically the entire body surface.

Treatment

A relationship of zinc to parakeratosis was suggested in a number of reports indicating beneficial effects obtained by supplementing one pound of diet with 90.8 mg. of zinc carbonate[3]. The effect of zinc supplement diet for treatment of seborrhea oleosa was investigated in the following manner: Nineteen nursing pigs in three seborrhea oleosa affected litters were fed 50 mg. of zinc carbonate (via gelatin capsules) daily for seven days, while 22 pigs in three other affected litters served as control animals. Seven animals from the group receiving zinc carbonate supplement diet and ten from the control group died within the following three weeks. There was no significant difference in the recovery rate among the animals of both groups.

Conclusion

From the limited data presented in this report, the cause of seborrhea oleosa appears to be of noninfectious character. No significant therapeutic effect was obtained when 50 mg. of zinc carbonate was administered daily *per os*.

The recent finding on etiology of parakeratosis suggested that mineral imbalance, in particular the calcium-zinc relationship, was important as a disease contributing factor, although the specific cause is unknown. Clinical similarities of parakeratosis and seborrhea oleosa suggest possibility of the latter also being associated with inadequate nutrition of the dams.

The fact that the disorder occurs in very young animals and that maturity appears to favor recovery, suggests that endocrine imbalance should be considered as an etiological influence.

REFERENCES

1. Kernkamp, H.C.H. *N. Am. Vet.*, 29:438, 1948.
2. Kernkamp, H.C.H., *et al.*, Parakeratosis In Swine. Proc. Book, Am. Vet. Med. Assn., 92nd Ann. Mtg., 1955, p. 77.
3. Tucker, H. F., and Solmon, W. D., Parakeratosis, Or Zinc Deficiency Disease In the Pig. *Proc. Soc. Exptl. Biol. and Med.*, 88:613, 1955.

▼ ▼ ▼

Cobalt Supplement

Amongst other trace elements essential to bovine health and vigor, cobalt occupies an important and vital place. One ounce of cobalt sulfate dissolved in one gallon of water is the usual stock solution. One ounce of this stock solution in a three gallon bucket of water once daily is the approximately correct dose.—*R. R. Dykstra, D.V.M.*

▼ ▼ ▼

Practical Laboratory Procedures

(Continued from page 420)

of formulating an accurate diagnosis is lessened considerably by routine application of such procedures. The small amount of time consumed by performing screening tests is negligible when compared to the time and expense involved in attempting to rectify a diagnostic error which might have been avoided had such tests been employed.

REFERENCES

1. Todd, G. C. and Sanford, A. H., Clinical Diagnosis by Laboratory Methods. W. B. Saunders Co. Philadelphia and London, 11th ed., 1948.
2. Wells, B. B., Clinical Pathology, Application and Interpretation. W. B. Saunders Co., Philadelphia and London, 1950.
3. Hepler, Opal E., Manual of Clinical Laboratory Methods. Chas. C. Thomas, Publisher, Springfield, Ill., 4th ed., 1949.
4. Coffin, D. L., Manual of Veterinary Clinical Pathology. Comstock Publishing Assoc., Ithica, N. Y. 3rd ed., 1953.
5. Newberne, J. W., Anemia in the Canine with A Note on Blood Groups. *Auburn Vet.* (Spring), 1954.

Panel on Large Animal Diseases†

The panel was moderated by Dr. R. C. Klussendorf. Panel members were Dr. Lester Proctor, practitioner, Oelwein, Iowa; Dr. E. F. Ebert, director of clinics, University of Missouri, Columbia; Dr. R. L. Baker, practitioner, Spencerville, Ohio; Dr. Wilson Henderson, poultry pathologist, Purdue University, Lafayette, Ind.; Prof. J. H. Conrad, Swine Husbandry Department, Purdue University; and Mr. George Gilbert, State Board of Pharmacy, Indianapolis, Ind. The comments along various lines have been condensed and grouped for easier reading.

Nutrition

GILBERT: In horses, nutritional deficiencies are being observed and reported with ever-increasing frequency. The late Dr. W. W. Dimock used to say that during the first years of his service at Lexington about 2% of the carcasses autopsied revealed evidence of nutritional problems, and that this had increased to 25% during his later years.

The problem of the relationship between nutrition and efficiency is being studied. For every good horse on the track, many poor or mediocre ones have been eliminated during the process of rearing and training. Whether this is due to faulty feeding, breeding, or training methods remains to be determined.

CONRAD: The feeding of hormones does not produce the same results in pigs as it does in cattle. We have just compiled the results of some experiments at Purdue in which the female hormone (diethylstilbestrol) and the male hormone (methyltestosterone) were fed to swine. The latter increased the lean meat of the carcass by 5%, while the former caused swelling of the vulva, mammary gland, and teats. The latter two occurred in barrows as well as gilts, and in pigs following cattle eating stilbestrol supplement or in pigs eating rations in which this hormone was present in the feed.

The testosterone results are only preliminary and must be repeated before results may be considered conclusive.

PROCTOR: Hypocalcemia and ketosis of cattle can often be differentiated most easily on the basis of history. Practically all of the ketosis cases occur in from six days to six weeks following parturition. Hypocalcemia may occur at any stage of lactation or gestation.

The "downer" cow, without recognizable milk fever or ketosis, has not appeared in my practice.

CONRAD: Urea fed to cattle or lambs should not pass through the digestive tract and appear in the feces in amounts which would cause intestinal irritation in pigs following cattle. Microorganisms of the rumen break urea down to liberate the nitrogen as ammonia. This occurs so promptly and so completely in the normal ruminant that no urea is found in the feces.

HENDERSON: Blowouts and pickouts are most common in pullets brought rapidly into full egg production. They can be prevented by feeding a ration somewhat lower in protein; and by withholding laying mash during the early stages of laying, thus bringing the pullets into full production slowly. The pickouts result from lack of muscle tone, which permits eversion of the cloaca, thus exposing tissues which are further irritated and damaged by picking.

When the picking habit has been established, it is difficult to break. However, use of "specs" to interfere with forward vision, or of "depeck" products to simulate eversion but to give an unpleasant taste, have reduced the severity of the losses.

CONRAD: The unidentified growth factors are substances added to the ration to stimulate growth, even when all known nutrients are supplied in adequate amounts. At least three factors are generally recognized, and an abundance of one does not replace the others, except possibly to a minor degree. These factors are contained in whey and milk products, in meat scraps, in fish products, and in legumes and grasses.

Certain fermentation byproducts may contain some or all three of the factors. These byproducts are now being studied as possible sources, at lower costs than those supplied by fish and milk.

Mastitis

EBERT: No well established case of mastitis is ever "cured," in my opinion.

The work of Dr. R. L. Kitchell at Minnesota, in which he studied the structure of the udder by infiltrating the lobules and then digesting away the tissues, gave us a picture of udder structure which differs from that of the textbooks on anatomy. Each of the tiny sinuses,

†Presented at the 72nd Annual Convention of the Indiana State Veterinary Medical Association, Indianapolis, Jan. 11-13, 1956.

the lobules or acini, is directly connected with the lobules adjacent to it. Therefore, when a lobule becomes infected, the bacteria readily escape to other lobules or acini. When medicating solutions are introduced through the teat canal, they may force the infective bacteria into new lobules instead of destroying them.

We have followed such cases, which after treatment appeared to be negative on culture. When brought to autopsy after death from some other cause, we have invariably found abcesses containing pus from which the mastitis-producing organisms could be cultured. Sooner or later, these abcesses would have been ruptured to discharge the bacteria into the lactating tissues.

BAKER: Cases of gangrenous or toxic mastitis can be treated successfully. The response is much more satisfactory if the local or mammary treatment is supported by 5% glucose solution administered intravenously. The total dose may be one, two, or three gallons, using the so-called Roberts or continuous drip method over a period of 24 to 48 hours.

EBERT: The trend in mastitis control is largely in the direction of treatment but should be toward prevention. The dairyman has learned that antibiotics can be bought and used without prescription, and he has been encouraged to use them frequently and freely. Usually, no mention is made of the need for proper diagnosis, for sanitary stalls and barnyards, nor for other preventive measures.

It is discouraging for a practitioner to enter a dairy barn and find an assortment of treatment materials on the shelf—all of which have been used without success before he was called. Sometimes the case has already been treated for several weeks. The prognosis in such cases is always poor.

Prevention, on the other hand, can be successful at a nominal cost. Some years ago, the Kansas City Board of Health had a system of monthly physical inspections of all dairies supplying milk to the city. Veterinarians making the inspections eliminated infected cows which could act as spreaders. They also suggested improvements in housing and management. As a result, they controlled mastitis more effectively than this is now being done with antibiotics and similar instillations into the udder.

EBERT: Mechanical milkers can induce mastitis, but only as a result of failure to keep the system and its units properly adjusted. Excessive vacuum may cause eversion of the teat canal, poorly placed drainage valves may cause eversion of the teat canal, poorly placed drainage valves may cause uneven vacuum, et cetera.

Whenever a milking machine is suspected as a possible source of trouble, be sure that the field representative for that particular make is called to make the necessary adjustments. The machines are well constructed and they perform well when properly installed. Each company is anxious to keep its machines working efficiently, and the field representative will appreciate an opportunity to check installations that are suspected of causing trouble.

Obstetrics

PROCTOR: A large animal obstetrician should have an arm the diameter and length of a broom handle, jointed every six inches, and strong as a bull.

Three things are highly important in bovine obstetrics: (1) Learn to repel before pulling, (2) leave sufficient fluid for lubricating during expulsion, and (3) save the big pull until contraction of the uterus is helping.

Most cases of dystocia will have permitted the fetus to pass the cervix. When this has occurred, find a solid point of contract—the scapulo-humeral articulation in anterior presentation, or the stifle joint in posterior presentation. Repel and manipulate or rotate to permit passage from another position.

Miscellaneous

GILBERT: The appropriate dose of Fowler's solution is 1 oz. in a bucket of drinking water. This may be continued to effect, or almost indefinitely.

BAKER: Vaccination of hogs for leptospirosis has been reported, and has been effective in a considerable percentage of field cases. As with all vaccinations, some failures occur.

HENDERSON: Moulting can be prevented, but can not be stopped or interrupted once it has started. Pullets should not moult, and when they do it is usually induced by lack of water, presence of disease, heavy parasitism, or faulty management of a serious nature.

▼ ▼ ▼

The number of pounds of poultry condemned by the Poultry Inspection Branch, Department of Agriculture, as unfit for human consumption ranged from slightly over 4,000,000 in 1951 to nearly 7,000,000 in 1954.—*Joe W. Atkinson, D.V.M.*

Advances Made In Swine Practice

H. C. SMITH*, D.V.M., Sioux City, Iowa

Part IX: Transmissible Gastroenteritis

ALMOST devastating disease of baby pigs has appeared in swine herds during the last 20 years. A great deal is known about it; including facts related to its short period of incubation, symptoms, and severity. How to prevent or control the disease is not known.

Transmissible gastroenteritis makes its appearance usually in the spring of the year. If spring production is lost, the sows may be rebred for summer litters and pigs resulting from such breeding usually do not become infected. It may however make its appearance in the fall of the year (less frequently), though death losses experienced have been equally severe regardless of season.

Most practitioners recognize clinical signs of this disease when the pigs are small, but it is rather difficult to make an accurate diagnosis in older animals. Enteric anomalies may not always be recognized or differentiated in feeder pigs. Among this latter class, duration of transmissible gastroenteritis is from three to five days.

Scouring and an acute loss of weight may be the only symptoms exhibited.

Disease History

In a well prepared series of articles, Hurt[1,2,3,4] described a disease condition in baby pigs which caused an extremely high rate of mortality. Most pigs died on about the third day after birth. He called the disease "three-day pig disease". Etiology was not recognized at that time.

In 1937, the writer was called by a practicing veterinarian in central Minnesota to investigate losses in baby pigs in the community. Approximately 23 herds of swine were involved. Losses in pigs less than ten days of age were described as unusually large. Older pigs and sows were also observed to be ill; only a few of the latter died. Some farmers were of the opinion that the sows' milk was poisonous and that this accounted for sudden deaths. Facts related to vomiting indicated intake of an irritating substance.

*Allied Laboratories.

Symptoms

Primary symptoms exhibited by baby pigs were vomiting, dehydration, a peculiar squeal as if in pain, scouring, and death in 24 to 48 hours. No elevation in body temperature was noted. The attending veterinarian had used about everything he could think of to control the disease, including hog cholera antiserum, dextrose solution, and most of the then used so-called intestinal astringents. No treatment used had apparent value. At the time of my arrival, the local veterinarian had noted that some of the pregnant sows had a siege of scouring and, in some cases, were observed to vomit. When these farrowed, their pigs were not affected by the disease. He was of the opinion that a hyperimmune serum could be produced which would be of benefit to the pigs farrowed in future years. He was convinced, as was I, that this was a new disease. I did not know what the disease was and so informed him. It appeared in droves in which the sows were immune to cholera as well as in herds that had not been immunized. Rations for sows on the different farms were variable and could not be related to the disease condition. Sanitary conditions on the farms surveyed were as variable as feed practices. At that time, considerable material was collected, but efforts to reproduce the disease failed. We did not realize at that time that baby pigs might possibly have aided in experimental reproduction of the disease for study. Bacteriological cultures failed to reveal any suspicious forms. This condition did not reappear on the same farms during the fall or the following spring.

In the spring of 1940, the writer was called to observe a condition in small pigs near the town of Humboldt, Iowa. The owner was engaged in the gravel business and had gathered together about 100 bred sows as a sideline. They were of mixed breeding and breeds. Animals were divided ten to a shelter and were allowed to farrow wherever they made a nest. Water was piped to the houses. Houses were cleaned by two men with a team and manure spreader. Feeding was accomplished by means of self feeders and was considered adequate. The sows were not allowed outside the houses. Ventilation was apparently satisfactory in that

the houses were usually dry. The first few sows farrowed all healthy pigs. Then a few sows farrowed premature pigs. The owner assumed that they had been injured or mishandled when being placed in their respective houses, and in his opinion, this accounted for the losses. The death loss, however, was not large. Weather conditions became inclement, making care of sows rather disagreeable for a period of a week. The owner did not visit his farm operation for several days. When he did visit the newly established enterprise, he found that some unusual illness had developed in the baby pigs and that all of the sows that had farrowed during the disagreeable and wet weather had lost their pigs within the first three days of their lives. He felt that he was to blame because he had not been around to supervise caretaking. At the time of my visit, the 20 sows that had farrowed early in two houses were growing well and appeared in general good health. These sows were nursing 170 pigs. One house of ten sows in which abortions had taken place had 62 pigs. There were four houses that contained 40 sows that had farrowed 282 pigs of which only 43 remained alive. The remaining sows in the other houses were farrowing normally at the termination of their pregnancy. As one would expect in an operation of this size, some of the sows proved not to be pregnant. The disease ran its course through the pigs as they were born. This project or hobby proved to be a poor financial enterprise. The owner still insisted that it was his fault because he did not carefully supervise all of the operations. As I look back on this experience, I feel that the disease was possibly infectious gastroenteritis and that it was spread by caretakers going from one infected pen to another during the height of the disease.

Experimental Work

L. P. Doyle and L. M. Hutchings[6] reported cases of disease that apparently spread from baby pigs and brood sows to feeder pigs on the same farm. They gave the disease the name of gastroenteritis because it was descriptive of the primary symptoms and pathological lesions. They were unable to transmit the infective agent to a calf. Hog cholera antiserum had no effect on pigs affected with gastroenteritis. They demonstrated contagiousness of the disease by taking a naturally infected pig and placing it in a pen with a sow and a litter of eight one-day-old pigs. At the end of 24 hours, the pig was dead and two of the exposed pigs had developed diarrhea; at 48 hours, most of the exposed pigs were sick; on the third day, three were dead and by the end of the fifth day all were dead.

During the spring of 1947, J. S. Koen[8] spent most of his time in northwestern Iowa visiting droves with local practicing veterinarians. He estimated that at least 30,000 pigs died of the disease. My own personal records of death losses at that time were 13,400, not all of which were included in Doctor Koen's estimate.

The following is a list of the agents which were used during 1947 in an attempt to save some pigs: Hog cholera antiserum, erysipelas antiserum, hemorrhagic septicemia antiserum, mixed bacterins to sows and pigs, glucose solution, vitamin B complex, the vitamin A concentrates, sulfonamides, arsenicals, B_{12}, buttermilk and sweet milk, with and without limewater, Hartman's solution, Ringer's solution and Sorenson's buffering solution. Sows were treated with Glauber and Epsom salts and many were treated by the "salt" method.

At that time, Koen was desperate and willing to try anything that was suggested.

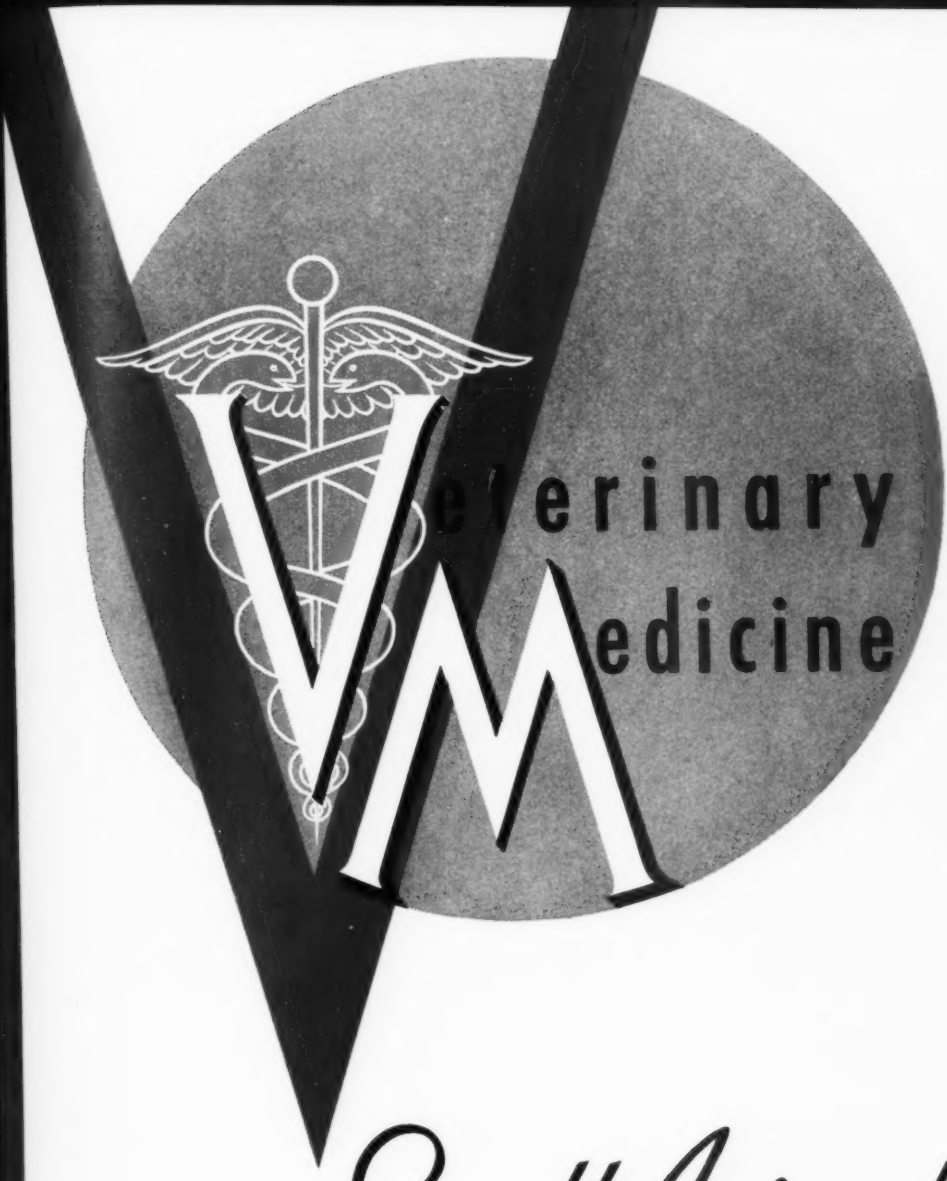
In the spring of 1947[7] an epidemic of swine enteritis ravaged among droves of central Ohio. Suckling pigs were the most susceptible. The disease was fatal in 90% of pigs less than ten days of age, and to 40-50% of those from two weeks until weaning age. Older hogs succumbed only occasionally. Growers were advised to keep strangers, feed and mineral peddlers, and neighbors out of the hog houses for fear they would carry the disease to the livestock on additional farms. Treatment was not effective with sulfonamides and/or antibiotics.

In a special radio broadcast over Station WBNS of Columbus, Ohio, April 1947[9], the announcer advised that 91 of 135 baby pigs farrowed at the University Farm had died of a new disease. A conference of research men and specialists was called for a meeting at the University to map a plan of attack to stop the spread of the disease.

C. C. Hastings[9] stated that the physical characteristics of swine that compel them to consume large quantities of dirt and barnyard filth with their feed preclude the possibility that any disease condition will remain uncomplicated for even a short period. Diseased swine are invariably infected with many organisms in addition to the causative agent of the primary disease. Few diseases of swine today are uncomplicated.

J. D. Ray[10] supported the idea that this virus may appear in a herd from nowhere and, in most cases, proceeds to kill all pigs farrowed on the premises from that date on. He re-

(Continued on page 435)



Small Animal

SECTION

THERAPEUTICS • MEDICINE • SURGERY

Lockhart's
SINGLE INJECTION PROTECTION
against canine distemper
for dogs of all ages and breeds

Ashe Lockhart's Modified Live Virus Canine Distemper Vaccine (Chick Embryo Origin) has successfully immunized dogs of all ages and breeds against Canine Distemper. Since only one injection is required, it is economical in both cost and time.

Prepared by serial passage of modified canine distemper virus in embryonated eggs, the product is vacuum-dried and vacuum-sealed to insure stability and potency for long periods. A single injection develops a solid, long-lasting immunity.

Lockhart's Modified Live Virus Canine Distemper Vaccine can be given simultaneously with a prophylactic dose of Anti-Canine Distemper Serum and Anti-Infectious Canine Hepatitis Serum (Lockhart). This provides passive immunity against *both* diseases, eliminating any possible sub-clinical, latent infection while the animal is being immunized against canine distemper.

Lockhart's Modified Live Virus Canine Distemper Vaccine (Chick Embryo Origin) is available only to graduate veterinarians.

LOCKHART

ASHE LOCKHART, INC.
800 WOODSWETHER ROAD KANSAS CITY 6, MISSOURI

Some Concepts Of Canine Distemper Immunization†

RICHARD L. OTT,* D.V.M., Pullman, Washington

THE success of any vaccination program is, and must be, finally measured by its effect in preventing disease under field conditions. Records to date indicate that distemper immunization has been remarkably successful, but unfortunately not perfect. A good reason for this apparent lack of perfection is that each patient vaccinated is an individual; yet, in a report, these individuals become statistics—successes or failures. Too often, the fact is overlooked that individual differences in patients vaccinated influence the success of an immunization program equally as much as the antigen used.

The distemper immunization problem in the puppy obtained from the local animal shelter has little in common with the immunization problem of the puppy reared in a kennel where isolation is the rule, or the puppy who, with his dam, has had free run of the neighborhood. A method of vaccination that is equally adaptable to all situations simply does not exist, at present. If a vaccination program included dogs in all these categories, a significant number would not become clinically diseased. A smaller percentage would become clinically ill and these would be called vaccination failures. Veterinarians are prone to condemn a program because of a few apparent vaccination failures without a clear understanding of the reason for failure. The purpose of this paper is to attempt to explain some of the possible reasons for failure.

It can be assumed that the average bitch will either have been vaccinated or will have been exposed and developed a natural resistance to distemper by the time she has her first litter of puppies. This bitch passes distemper antibodies to her puppies to some extent *via* placental transfer or largely through the colostral milk. The puppies receive this protection within the first few days of life, as the antibodies are concentrated in the colostrum and also because antibodies can not be absorbed unchanged later in life. Consequently, the serum neutralizing antibody titer rises as the puppies absorb antibodies and declines as they are eliminated. This passive transfer of neutralizing antibodies is illustrated in chart 1*. It can be seen that some neutralizing antibodies are present at birth, before the puppy suckles. The titer rises as colostral antibodies are absorbed and declines as this passively transmitted protection from the dam is eliminated by the puppy. When the puppy reaches six weeks of age, the antibody titer is extremely low; although this low level may persist for a variable period.

During the period that the titer is high, the puppy is not clinically susceptible to distemper and, if exposed, will not succumb. The puppy's antibody-forming mechanism may be stimulated by this exposure and it may develop an active resistance. Chart 2 illustrates the effect of early exposure to virulent distemper virus

†This paper is from an address presented at the 72nd annual meeting of the Indiana State Veterinary Medical Association, Indianapolis, January 11-13, 1956, and the American Animal Hospital Association, 23rd annual meeting, Miami Beach, Florida, May 23-26, 1956.

*Doctor Ott is associate professor and chairman of the Department of Clinical Medicine and Surgery, College of Veterinary Medicine, State College of Washington.

*It should be noted that all charts are hypothetical examples drawn from averages of large groups of animals. The neutralization indicates should not be interpreted as exact figures. The charts were prepared for presenting ideas in an easily understood manner.

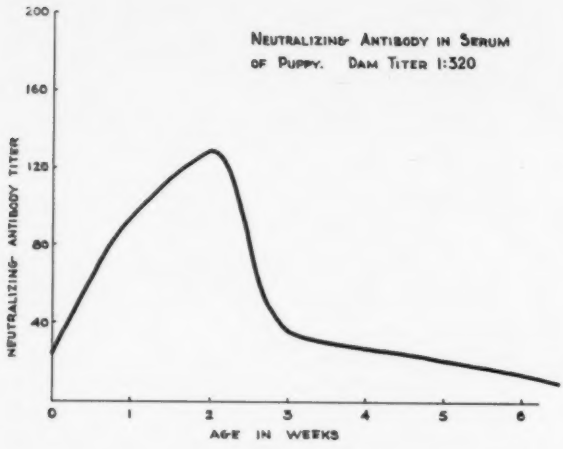


Chart 1.

on the serum neutralizing antibody titer of a puppy. The solid line indicates the actual titer, while the dotted line indicates the expected titer had the animal not been exposed. It could be hypothesized that this type of "natural vaccination" occurs in a number of puppies under field conditions if no attempt is made to protect the suckling from exposure to virus.

It might seem that a vaccination program could make use of virulent virus during the suckling period; however, there are dangers involved in such a program. It was assumed that the average bitch is resistant to distemper and passes a share of this resistance to her puppies. It must be understood that the passive transfer of protection is a quantitative factor dependent somewhat upon the resistance of the bitch. A bitch that is intermittently exposed to distemper virus develops a much greater resistance and thus should pass more to her puppies. This factor is illustrated in chart 3 using three examples. Litter A is from a dam with average resistance to distemper; litter B is from a dam with high resistance; and litter C is from an isolated dam with low resistance. If all puppies were exposed to virulent distemper virus at three to four weeks of age, it is probable that the puppies from litters A and B would not become clinically ill, whereas the puppies from litter C would succumb. Often, when distemper is diagnosed in the suckling puppy, it will be found that the dam is also infected. In these cases, the dam could not passively transmit enough antibodies to protect the puppies because her antibody level was not high enough to protect herself.

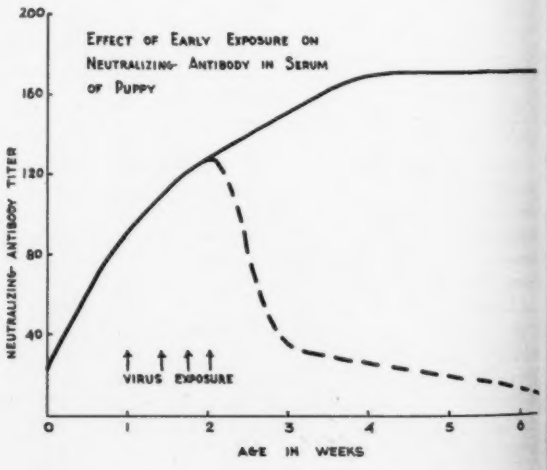
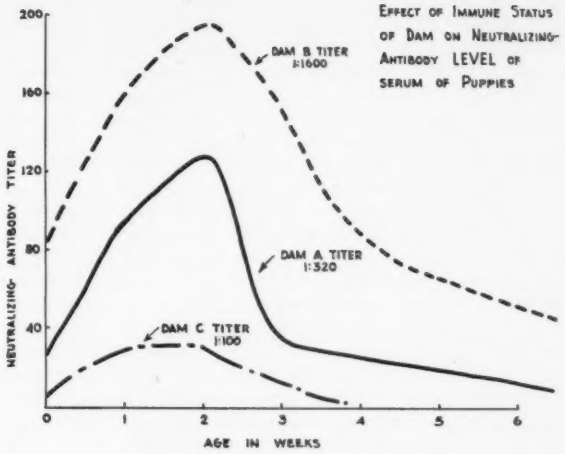


Chart 2.

Chart 3.



If it is believed that there is a likelihood that a group of puppies will be exposed to distemper virus during the first six weeks of life, it would be well to make certain that the dam has a sufficiently high antibody titer to assure the passive transfer of antibodies to protect the puppies. Although in most instances it would be unnecessary, vaccination of the proposed dam either before breeding or 30 to 45 days after breeding would tend to assure this protection for the puppies. In kennels where distemper in very young puppies has been a problem, such a procedure has markedly reduced or eliminated that problem.

Although the administration of virulent virus or an incompletely modified virus to puppies three to five weeks of age has been a successful distemper vaccination procedure in the hands of some practitioners, it should be realized that this procedure may be hazardous and success may be dependent upon the presence of enough passively transmitted antibody to protect the puppy yet not enough to interfere completely with the growth of the virus.

A egg adapted modified live virus is antigenically similar to its virulent relative. Investigation, however, has demonstrated that one inoculation of an egg adapted modified live virus can not overcome a great deal of interference from the passively transmitted maternal antibodies[4, 8]. If these antibodies are in fairly high concentration, they destroy the egg adapted virus and no antigenic stimulus follows. If an antibody response is to be expected, the modified virus must be administered when the passively transmitted antibody is at a low level.

Chart 4 illustrates the ideal neutralizing antibody response to the administration of vaccine. The antibody curve on the left of the chart illustrates the rise and fall of the passively transmitted antibody from the dam. When the puppy is six weeks of age, the passively transmitted antibody has declined to a low level that does not interfere with the vaccine and the puppy responds with the production of neutralizing antibodies. Chart 4 also demonstrates that passively transmitted antibodies from the average dam will protect the puppies against exposure to virulent virus until they are approximately five to six weeks of age. These same antibodies will interfere with attempts to immunize the puppies with an egg adapted modified live virus until they are six to seven weeks of age. Thus there appears to be a period of susceptibility to virulent virus when the puppy is still too young to immunize with egg adapted modified live virus.

Many veterinarians advise the use of antiserum during this period. Experimental results to date indicate that the protection afforded by antiserum declines in a manner comparable to the decline of the protection afforded by antibody passively transmitted from the dam. This work is extremely difficult to confirm; however, chart 5 is included to illustrate this very controversial point. The results to be expected are somewhat dependent upon the dosage of antiserum administered. In the curve illustrated, a massive dose of antiserum had been administered. The curve of effect might perhaps be considerably shortened if average dose of antiserum were used.

It has been established by Cabasso *et al.*[8] that distemper antiserum given simultaneously

with egg adapted modified live distemper virus will not interfere with the virus and active resistance will be developed. However, the curve in chart 5 illustrates that antiserum administered two to three days prior to the egg adapted virus might interfere with that virus and no active resistance would develop. Following the curve illustrated in chart 5, it will be found that approximately nine to 12 days after the administration of antiserum the animal will be incompletely protected against exposure to virulent virus; yet, at the same time, the antiserum may interfere with an attempt to immunize with egg adapted modified live virus. This, again, illustrates the fact that seemingly a period of susceptibility to the disease must exist before the dog can be immunized with egg adapted live virus. If antiserum alone is administered to the six-week-old puppy, the period of susceptibility would possibly occur at seven and one-half to eight weeks. If antiserum were again administered at this age, the period of susceptibility would possibly occur at nine and one-half to ten weeks of age. Previous studies by Ott, *et al.*[4] have shown that the ten- to 12-week-old puppy is much more apt to be exposed to distemper than the six-week-old puppy. If a period of susceptibility must exist, it would seem less dangerous at five to eight weeks of age than at ten to 12 weeks of age.

If a recommendation is made for vaccination of puppies with egg adapted modified live virus at an early age, a factor previously mentioned must also be considered. That is, the modified virus must be administered when the passively transmitted antibody is at a low level. Because of the fact that the passive transfer of antibodies quantitatively is dependent on the immune status of the dam, it is impossible to state exactly what is the ideal age to commence active immunization of puppies with a modified egg adapted virus. This is illustrated in chart 6, again using the hypothetical litters A, B, and C — puppies from dams of average, high, and low grade resistance to distemper. An egg adapted modified live virus has been given to all puppies at six weeks of age. The puppies from litters A and C have responded to that vaccine with the production of neutralizing antibodies. When challenged with virulent distemper virus at six months of age, they did not succumb. The puppies in litter B (from a dam of high resistance) still had, at six weeks of age, enough passively transmitted antibody to interfere with the egg adapted virus and no increase in neutralizing antibodies was produced by vaccination. When challenged with virulent distemper virus at six months of age, these puppies succumbed.

It should be recognized that perhaps only a limited number of puppies comparable to those of litter B would be encountered in performing distemper immunization procedures in practice; however, in order to afford protection to the largest number of dogs possible, the use of one dose of modified distemper virus at six to seven weeks of age, followed by another dose at eight to nine weeks of age, would seem to be a sound recommendation for distemper prophylaxis. To date, there has been no indication that the passively transmitted maternal antibodies have persisted in high enough concentration to interfere with vaccination of any puppy eight weeks of age or older.

Further investigations may disclose that the

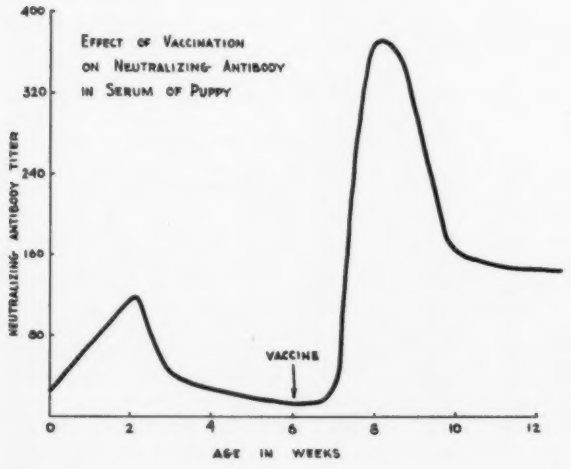


Chart 4.

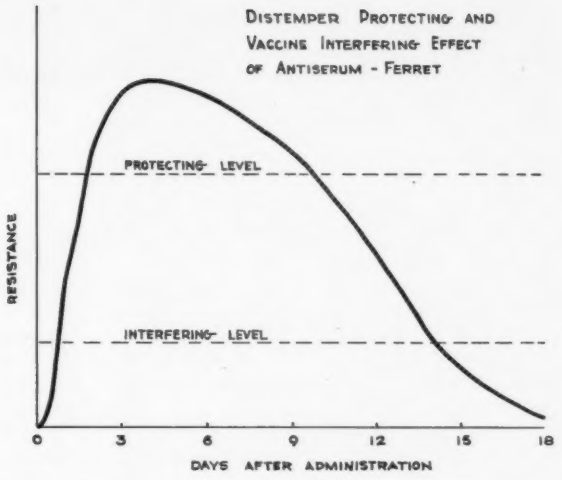


Chart 5.

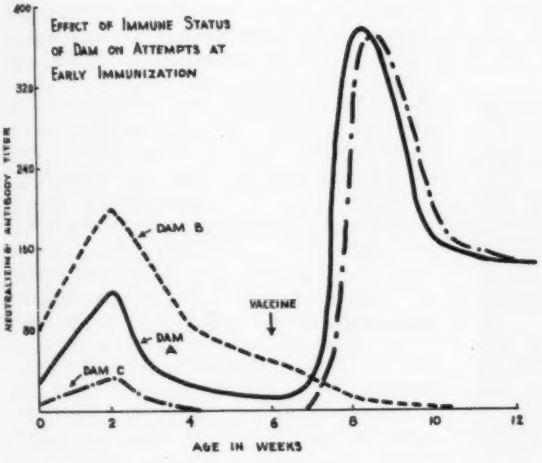


Chart 6.

passively transmitted maternal antibodies may be overwhelmed either by repeated use of the antigen at early ages or by the use of a stronger antigen, as perhaps a less modified virus. A great deal of experimental work is underway.

Regardless of the results of these future experiments, it must be realized that there is more to a vaccination program than the haphazard injection of an often mistreated biological product. Successful vaccination not only involves the introduction of a reliable antigen, but also an understanding of the expected reaction of that antigen in the individual patient's body.

REFERENCES

1. Ott, R. L., and Gorham, J. R., The Response of Newborn and Young Ferrets to Intranasal Administration with Egg Adapted Distemper Virus. *Am. Jour. Vet. Res.*, 16:571, 1955.

2. Ott, R. L., Gorham, J. R., and Gutierrez, Joyce, Distemper in Dogs II. The Response to Vaccination. Manuscript in preparation.

3. Cabasso, V. J., Stebbins, M. R., and Cox, H. R., Experimental Canine Distemper Encephalitis and Immunization of Puppies Against It. *Cornell Vet.*, 44:153, 1954.

4. Ott, R. L., Gorham, J. R., and Gutierrez, Joyce, Distemper in Dogs I. Virus Neutralizing Antibodies in Serum Collected from Healthy Dogs. *Jour. Am. Vet. Med. Assn.*, 26:290, 1955.

Cats And Unusual Pets Treated In My Practice†

L. E. FISHER, D.V.M., Berwyn, Illinois

DOMESTIC cats constitute no small portion of the practice at the Berwyn Animal Hospital. Although the writer until recent years did not own a house cat as a pet, most members of the species are interesting and responsive patients. Interest of our staff in the medical problems of cats has resulted in many owners seeking our services.

Most cat patients are cooperative and not difficult to handle. Understanding peculiarities is important. Unlike dogs, cats appear not to associate unpleasant experiences with persons. They do not hold a grudge and I have rarely been attacked by a cat following release of restraint. Restraint technic is important and must be applied with consideration. Formerly, many practitioners pointed out the necessity of carefully secured restraint. Those who have handled many of these animals know that light or properly applied measures are most useful. Never fight a cat. It is now routine in our hospital for one man to handle and treat a cat in giving many intramuscular or intravenous injections. A liking for these patients is rewarding. We do use gauntlet gloves on occasion and those who handle cats have been made aware of the fact that some are "wildcats." Even in these cases a studied method is recommended with the exercise of patience.

Fig. 1. Dr. L. E. Fisher, zoo veterinarian, Lincoln Park Zoo, Chicago, extracts tooth to correct malocclusion in lion.

Cats are well adapted to indoor living and thus fit in well in metropolitan areas of population congestion. The species is generally vigorous and disease resistant. Cats are seldom ill if properly fed, vaccinated for feline distemper, and given ordinary good care. Treatment of fight and accident wounds constitute a large part of our cat practice, although neither of these occur in wholly confined pets.

Abscesses resulting from fight wounds are treated by surgical drainage, administration of penicillin and, most frequently, 24 hours hospitalization. During this period temperature reaction has passed and a schedule of treatment may be recommended that can be depended upon to effect prompt and complete recovery.

Distemper Prophylaxis

Many young cats are presented for preventive vaccination for feline distemper. Our usual practice is to administer two injections at seven-to-ten-day intervals. Vaccines frequently cause local irritation when administered so that a practice has been followed of advising owner of probable reaction of brief duration before giving whatever product is employed. Little distemper antiserum is given. Vaccines, antibiotics, and supportive therapy are useful in treating feline distemper.

Digestive Disturbances

The abdomen of a cat can be palpated thoroughly without the experience of tension so common in dogs. Abnormalities such as tumors, foreign bodies, et cetera, can be palpated with comparative ease.

Constipation is not uncommon nor are hair concretions and parasites. Vaseline placed in

†Presented at the 72nd annual convention of the Indiana Veterinary Medical Association, Indianapolis, Jan. 11-13, 1956.

the roof of the mouth or the nose helps prevent or treat the former. The latter is responsible for some temporary nervous symptoms. Several acceptable anthelmintics have proved useful. Ear mites are common. Skin diseases are often stubborn.

Surgery

Castration of tomcats earlier was performed at two to three months of age. Recently, our practice has been to delay surgery until the patient is at least six months of age. There appears to be less difficulty in tomcats castrated after adequate time has been allowed for development of parts involved in obstructive calculi.

Oophorectomy in cats is common surgical practice. Optimum time for surgery is immediately prior to puberty.

When good surgical methods are employed wounds heal by first intention. We discharge young females the day following oophorectomy. Danger of prolapse after abdominal surgery is minimum. Infection of surgical wounds presents no more difficult problems than are presented by infected wounds on dogs.

Other Pets

The writer functions as the professional part-time consultant of the Lincoln Park Zoo in Chicago. For this reason, unusual pets are frequently referred for medical or surgical care. Species including such mammals as monkeys, raccoons, ocelots, lions, and others, as well as reptiles and birds.

Most of these are generally considered unsatisfactory pets, but some persons become attached to these odd wild creatures and seek professional advice for their care. Tame and wild birds, including parrots, parakeets, and canaries are referred to the Berwyn Hospital on the average of six to eight patients daily. The first problem in regards to these birds is proper handling and sex determination. It is not unusual to err.

Recoveries for all anomalies of birds run approximately 50% of those presented for treatment. This also holds true for surgery. Anesthesia for surgery is induced by ether, adding a small quantity to pledget of cotton in a drinking cup; local infiltration for surgery is occasionally employed. Pinioning is requested by pet owners and is performed on some zoo specimens. Technic employed includes removal by surgery of one joint of the flight wing on one side. Hemorrhage is controlled by electric cautery.

We are convinced after some rather extensive experience that wild animals never make satisfactory house pets. Many finally are confined in zoos. Zoonoses too are a hazard, not appreciated by many persons, which has lately resulted in higher incidence of psittacosis—to cite one example. Some such as large cats (ocelots, tigers, lion cubs, et cetera) have mauled owners badly. Wounds inflicted by the

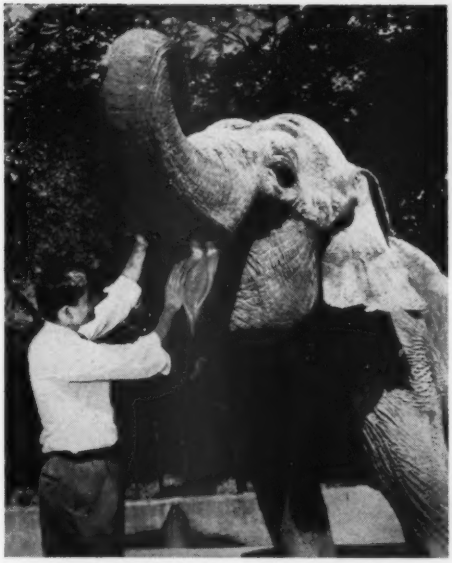


Fig. 2. Examination of teeth in an aged elephant. Planning and sometimes rehearsal are necessary to secure the animal's cooperation.

Fig. 3. Doctor Fisher and assistant examine ear of chimpanzee. Veterinarian and therapist function as a team in handling wild animals.

Fig. 4. Filing bill of toucan. Proper handling of birds is the first consideration and the biggest problem.

claws of a cat are especially serious. Onchotomy has been performed on a few patients, but is not recommended.

Chinchilla are being raised by many amateur fur farmers and some are kept as pets. Dentistry is possibly the most common reason these animals are referred to us. Nutritional diseases are common and Cesarian sections are performed occasionally. Problems of diagnosis are presented by anomalies of the skin.

Raccoons are susceptible to both canine and feline distemper so that vaccination against both these diseases is recommended.

Snakes and alligator (cayman) are maintained by some enthusiastic naturalists. Self starvation is a prime problem in these species. Force feeding is practical and in many instances preserves these zoological specimens.

Handling of wild animals requires study and careful planning—even rehearsal. This is especially true in zoo work. Each member of a team, including the surgeon or therapist, must know exactly what everyone will do and time action carefully. Squeeze cages and chutes are helpful for restraint, and use of the new tranquillizing drugs shows promise in work with wild animals. These matters are of concern to avoid injury to caretakers and patients. Medication and treatment in many respects follows accepted practices on like domesticated species.

Fur Chewing in Chinchilla

Chinchilla breeders are much concerned about so-called "fur-chewing" in their charges. Research has brought no conclusive results. At first the condition was generally ascribed to an imbalanced ration or to some deficiency in the food supply. Later skin irritants by such agents as parasites, molds, et cetera, or possibly something of an eczematous nature were investigated. All of these hypothesis and theories have been found untenable when subjected to rigid research under controlled conditions. The present trend is in the direction of psychology as an etiological factor. Those that have made a study of animal behavior, especially of those animals kept in unnatural surroundings under controlled conditions so that environmental stress results, a rather common condition in man, have observed abnormal behavior patterns in various domesticated animals. If "stress" is at the bottom of the trouble, that is, if it may appropriately be classed as a pernicious "habit," its relief or prevention may be in sight, which would be a boon to breeders now contending with this sporadic condition. If those veterinarians, from their experience, have constructive knowledge about fur-chewing, The National Chinchilla Breeders of America, Inc., P. O. Box 2579, or 118 First Avenue, Salt Lake City, Utah, will appreciate their help.

▼ ▼ ▼

Tularemia a Human Health Hazard

As the fall months approach, with the likelihood of increased incidence of tularemia in man and in animals, it is well to bear in mind the method of spread of the specific causative organism, *Pasteurella tularensis*. Tularemia is harbored by many species of wild animals, by some domesticated animals, and by the wood tick *Dermacentor andersoni* and other arthropods. Probably the wild rabbit is the most frequent source of human contamination resulting from careless handling of carcasses during dressing, and by incomplete cooking. The bite of the wood tick, dog tick, Lone Star tick, and the deer fly are also frequent sources of infection. The disease is not contagious from person to person though laboratory workers are relatively frequently infected. The problem is one of most importance because of the human health hazard. Veterinarians can help in the control of human infection by warning hunters and housewives of potential dangers of this common and widespread infection among game animals.—*R. R. Dykstra, D.V.M.*

ب

whatever your choice may demand in canine prophylactic or therapeutic measures, these laboratory-proved and field tested vaccines and serums by Fromm serve you dependably—

distemper
hepatitis
leptospirosis

DISTEMPEROID
(ferret origin)
Modified Live Virus
VACCINE
Desiccated

DISTEMPER VACCINE
Modified Live Virus
(chick embryo origin)
Desiccated

DISTEMPER VACCINE
Inactivated Virus
(tissue origin)

HEPOID
Inactivated Virus
VACCINE
Desiccated

BIOID
Inactivated Virus
VACCINE
Desiccated

distemper
distemper
distemper
hepatitis only
distemper hepatitis
distemper hepatitis
distemper hepatitis leptospirosis

BIVALENT SERUM

TRIVALENT SERUM

SOLD TO GRADUATE VETERINARIANS ONLY

contact your nearest distributor

FROMM LABORATORIES, INC.
GRAFTON, WISCONSIN, U. S. A.

Every Nutrient A Cat Is Known To Need

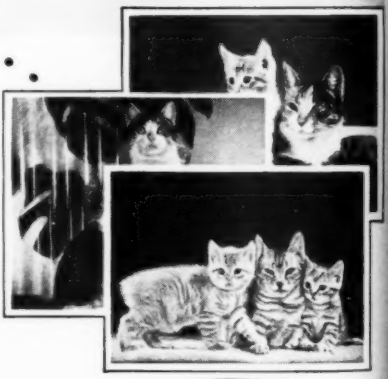
Many prepared cat foods—including some labelled "all fish"—will not supply balanced nutrition without supplementary feeding. Puss 'n Boots Cat Food is scientifically formulated to provide *every* nutrient a cat is known to need. The formula includes:

- ***Whole Fish*** (not scraps or by-products), with nature's own life balance of proteins, vitamins, minerals and other nutrients. Puss 'n Boots does not sell the fish fillets for human consumption, or the liver and glands (rich in vitamins and minerals) for medicinal use. All is retained, even the bone structure for its calcium — after being made soft and digestible.
- ***Selected Cereals,*** added to the finely ground whole fish to provide carbohydrates and roughage for all-round nutrition.
- ***Extra Vitamin B_1,*** added to every can as a margin of safety.

You can recommend Puss 'n Boots to cat owning clients with complete confidence in its nutritional excellence.

FREE! ***For your office walls***

Three cat photographs — in full color, 8" x 10", by Walter Chandoha, world's greatest cat photographer. Sent to you without charge on receipt of request on professional letterhead. Address Puss 'n Boots, Dept. X-66, Box 6586, Chicago 77, Illinois.



PUSS 'n BOOTS is good nutrition

America's largest selling cat food... adds the plus in health, beauty, vigor.

Coast Fisheries, Division of The Quaker Oats Company, Chicago 54, Ill.

(Continued from page 426)

ported that one Nebraska farmer lost all of the pigs that were farrowed from 45 sows.

L. M. Hutchings[11] disclosed that, if an ailing pig is placed in a litter, the entire litter will be dead in a few days. If there is one affected pig in a farrowing house, all pigs may acquire the disease no matter how strict the isolation. Under natural conditions, the infectious agent does not survive on the premises from one farrowing season to the next, but it may be reintroduced at any time.

S. H. McNutt and Paul Dacorso[12] reported that some of the affected pigs exhibited slight inflammation of the lungs and, from such lungs, they isolated a virus which is much like that of swine influenza but still differs from swine influenza virus enough to identify it as a distinct entity. They were able to reproduce the disease in much the same manner and degree as reported by Doyle. This virus, isolated by McNutt, is probably what is now known as Glasser's disease.

L. P. Doyle[13] reported that during the past 12 years or perhaps longer, there had appeared sporadic outbreaks of a disease in swine having the clinical features of an acute gastroenteritis. The disease had recurred on some farms in two or more consecutive farrowings and in fall as well as in spring litters. It might occur on farms where there were no baby pigs. Cases have been reported where the disease was apparently spread by persons going from diseased droves to healthy ones. During an acute outbreak, no one should be allowed to enter or leave the farm without disinfecting boots and making a complete change of clothing.

A disease among human beings characterized by sudden onset and profuse diarrhea, usually accompanied by vomiting and by a lack of fever, was reported by Irving Gorden *et al.*[14]. Symptoms ordinarily persisted for about three days. Bacteriological examination failed to reveal agents known to cause enteric disease and postmortem investigations also failed to indicate the nature of the etiologic agent. Epidemic gastroenteritis was transmitted to human volunteers by the oral administration of fecal filtrates. Incubation period ranged from one to five days, with a mean of three days. Attempts to cultivate the agent on chick embryos were not successful. Penicillin and streptomycin had no effect on the disease progress.

Since the disorder occurs early in the life of pigs (during the nursing period) it was thought by many practitioners that some toxic principle in the sow's milk might be responsible for

death losses. C. K. Whitehair *et al.*[16] collected milk samples from sows in herds where the disease was occurring and fed this milk to rats for a period of four weeks. No illness of any kind developed in the rats, in fact they developed at a rate of growth classified as good. This proved that there was no toxic principle in the sow's milk.

E. S. Feenstra *et al.*[16] confirmed the work of Doyle and Hutchings (1946) by their transmission experiments. They reported an initial rise in temperature in the first 24 hours after exposure, followed by a gradual decline until the pigs became moribund about four to six days after exposure. Hemorrhage in the wall of the stomach was a consistent lesion. Pigs which received the bacteria free filtrates appeared to have a less severe reaction than did those which were given a portion of the ground whole digestive tract. These investigators believe that filtration may have taken out a porion of the active agent.

Wm. W. Bay *et al.*[17] reported that their experimental work disclosed that dilutions of gastrointestinal filtrates as high as 1:1,000,000 in physiologic salt solution reproduced the disease. The minimum infective dose was small. Intracranial, intravenous, intramuscular, intraperitoneal, subcutaneous, and *per os* administration of filtrates of the gastrointestinal tract reproduced the disease. Heating the material for 30 minutes at 56 C. inactivated the agent. They reported that streptomycin and sulfamethazine were ineffective as a treatment for the disease.

The Report of the Chief of the BAI[18] stated that it was found that baby pigs, when taken from infected sows, could be raised satisfactorily by allowing them to drink cow's milk at will twice a day for one hour periods. In 1956, the pigs could be placed on what is called milk replacers.

A. A. Heiderbrecht *et al.*[19], investigated the possibility of a toxic substance or the lack of some dietary essential in the milk of sows nursing pigs having the disease. When the sow's milk was fed to rats, it was demonstrated that it did not contain any toxic substance and, growth and development of experimental animals indicated that the milk was nutritionally adequate.

John M. Nelson[20] attempted to immunize sows against infectious gastroenteritis while pregnant by feeding field cultures of the agent before they farrowed. The "field culture" consisted of saline washings of the intestines of four dead baby pigs affected with the disease and the vomitus of two sows. The material was mixed with Ringer's Solution and fed. The death loss in the pigs from these sows was approximately 35 per cent.

H. C. H. Kernkamp[21] stated that in differentiating between *Esch. coli* infection and transmissible gastroenteritis, that the age of affected pigs was the important factor. The gastrointestinal disturbances, in which *Esch. coli* has a causative role, are usually less severe than are those due to the Salmonella type of organisms.

L. M. Hutchings[22] stated that the differentiating diagnostic features of this disease in suckling pigs are the occurrence of vomiting and the character of the diarrhea, which resembles partially curdled milk. In older animals, the causative agent produces a transient diarrhea, followed by dehydration and loss of weight.

H. C. H. Kernkamp[23] presented a table of physical factors to be used in differential diagnosis of hypoglycemia, uremia-toxemia, and transmissible gastroenteritis of baby pigs. He

Mortality resulting from outbreaks of transmissible gastroenteritis in newborn may reach 100%. Severity of infection and incidence decrease with increased age. Prompt recovery follows infection in shoats after symptoms of dehydration, weight loss, and transient diarrhea.

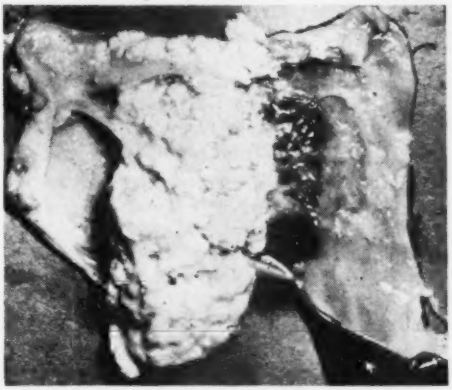
pointed out that information from a carefully collected case history, with symptoms displayed by the affected pigs, brings together certain facts which establish the diagnosis in many cases. He called attention to the fact that differentiating between the disorders and diseases of baby pigs in the first two weeks of life, without the aid of certain laboratory procedures, was often difficult. This certainly is true, because every veterinarian who has practiced has experienced at least some difficulty during his years of practice.

A. H. Quin[24] contended that probably the worst disaster that can hit any swine raiser is an outbreak of contagious virus borne gastroenteritis in baby pigs from three days to three weeks of age. The only assistance offered was the recommendation that farmers report the trouble early and move the well sows and litters away from old quarters and strictly isolate all brood sows before farrowing. He recommended dissolving 250 mg. of aureomycin® in 30 cc. of water and giving 1 cc. intraperitoneally to pigs up to one week of age. Oral use of the sulfonamides may aid some pigs. He cautioned not to expect too much in the way of recovery in the already infected pig.

J. D. Ray[25] stated that affected young pigs will exhibit marked dehydration and yellow diarrhea. These newborn will nurse, lie down a while, then vomit. After resting, they will come back and nurse and repeat the cycle time after time, getting weaker all the time, and continuing to show signs of thirst until they finally die of exhaustion.

L. P. Doyle[26] held that the disease may occur at any time of the year, but is most prevalent in the late winter and spring. This is the most likely time for appearance because of the age of susceptible pigs. Most pigs in the Corn Belt area are born between January and May. We have observed many cases occurring in the fall which followed certain rebreeding practices. Occasionally symptoms are observed first in sows. Those adults that suffer attacks during gestation farrow immune or resistant pigs. Affected feeder pigs may scour a great deal for a few days, lose weight, and then return to normal in a week or ten days without death losses in the herd.

W. W. Bay *et al.*[27] described the microscopic pathology of the stomach as a congestion of the terminal blood vessels to necrosis of the epithelium deep in the gastric crypts. Necrosis does not occur if the pig dies within a 24-hour period. Round cell infiltration was common in those areas where damage to the mucosa was pronounced. The lesions in the intestines were similar to those seen in the stomach. The blood vessels of the mucosa, submucosa, and muscular layers of the colon were congested and, in some cases, free hemorrhage was observed. Nephrosis may be demonstrated. Cloudy swelling of the tubular epithelium, especially in the convoluted tubules, was a nearly constant finding. These researchers were unable to demonstrate the presence of inclusion bodies. They did show that a certain degree of colostral immunity was passed to pigs nursing dams which had previously been exposed to transmissible gastroenteritis. This finding suggested the development of specific antibodies following infection.



Scouring and acute loss of weight may be the only symptoms exhibited by pigs infected with the viral agent of transmissible gastroenteritis. At autopsy stomach may be filled with a "cheesy" mass. Mucosal lesions are superficially inflammatory.

W. W. Bay[28] reported that of 7,172 pigs observed on 37 farms, 4,214 (58.7%) died of the disease. Most of the pigs died during the first ten days of life. Of the 2,958 (41.3%) pigs that lived, 944 were born two to eight weeks following the acute outbreak and were never sick. Majority, 67% of affected pigs died. About 1,350 (67%) of the pigs that recovered were ten days to six weeks of age when they became affected, and the remaining 33% were less than ten days of age. Sows that had been sick and had recovered three weeks or more before farrowing gave birth to normal litters, even when the pigs were born in the same quarters and in contact with sick pigs. This indicated an immunity in the sows.

A. B. Horlein, and E. H. Hubbard[29] reported that transmissible gastroenteritis of baby pigs was caused by a virus-like agent which is carried from farm to farm and, since the agent may become airborne, this factor con-

®Lederle Laboratories Div., Pearl River, N. Y.

tributes to the extreme rapidity to which the infection spreads through the entire herd. The only susceptible animal to this disease is the pig. It is almost impossible to free a farrowing house and equipment from this disease by cleaning and disinfection during an outbreak. As soon as the disease is diagnosed, the farrowing house is abandoned and the sows or gilts which have not yet farrowed are scattered out over the farm as far as possible from each other, in as small groups as possible, to farrow in individual hog houses or any temporary shelter which can be obtained. Great care should be exercised in feeding, watering, and the care of the isolated animals.

W. W. Bay *et al.*[30] reported that their experiments indicated that the causative agent of transmissible gastroenteritis is rather short lived outside the animal body under natural conditions. It is sensitive to formalin. Ground gastrointestinal tract material reproduced the disease after being stored for three years and six months at 28 C. No host except swine has been found up to this time. In the treatment of the disease, Bay tried circulin, streptomycin, tetracyline, sulfadiazine, sulfamethazine, sulfathaladine, and chloramphenicol. None proved to be of any value.

Geo. A. Young *et al.*[31] described a specific serum neutralizing antibody test in adult swine following exposure. Acute and convalescent sera may be quite easily obtained in any diseased herd and sent to a laboratory which can run the test. This test is not practical for routine diagnosis and is not intended for that purpose. The test involves the use of five-day-old disease-free pigs devoid of antibodies as test animals. It may be dificult to obtain such animals on a moment's notice.

Kyu M. Lee *et al.*[33] found that parenteral injections of virus failed to reproduce the disease. The natural route of infection was through the mouth. In the acute phase of illness, the virus was found in the blood, liver, spleen, brain, and lung in low concentrations, but it was present in high concentration in the intestines and kidneys. The virus could be recovered from the intestines in from two to eight weeks after inoculation. It could not be recovered from the urine. Pigs showing persistence of virus in the intestines were stunted and did not gain weight.

Elwood F. Reber, and C. K. Whitehair[32] reported that as a result of their experiments, the infection of the pigs with transmissible gastroenteritis resulted in a decreased food consumption and, in addition, an average retention of 50% sodium and 14% potassium. The pigs lost an average of 4% of their body weight during the last two 24 hour periods. The water in feces was increased 40-fold and hemoglobin increased significantly. This information should lead to the study of the treatment for the disease.

Geo. A. Young *et al.*[34] found that five-day-old pigs were refractory to large doses of the infectious agent on intratracheal instillation and intraperitoneal injections. Such animals were readily susceptible to virus on intranasal and intragastric instillation. Although the virus agent did not ordinarily multiply in lung tissue of six-day-old pigs following intranasal instillation, it multiplied readily in the lungs of pigs inoculated when two hours old. The opposite occurred in the nasal mucosa. The virus multiplied in the nasal mucosa of six-day-old pigs but not in two-hour-old pigs. The agent multiplied in all portions of the gastrointestinal tract. It had an incubation period of 48 hours. Resistance occurred in older pigs. In pigs less than one week of age, mortality was almost 100%. Specific transmissible gastroenteritis antiserum was produced in pigs at least four months of age and contained enough antibodies to neutralize the virus in the test tube and to protect live pigs.

Elwood F. Reber, and John W. Yousken[35] used a litter of seven-day-old pigs in an experiment to study the excretion of sodium, potassium, and nitrogen. They infected three pigs; four were used as controls. The fecal nitrogen, sodium, potassium, and calcium excreted by the infected pigs was greater than that excreted by the non-infected pigs. There was no negative balances of the nutrients investigated. They concluded that the retention of sodium was higher in diseased pigs. Diarrhea in baby pigs appeared to disturb the mechanisms of potassium absorption and retention to a greater extent than those of sodium and nitrogen. A high dietary level of sodium appeared to counteract the disturbance of potassium absorption and retention. This was progress.

Since 1947, we have kept accurate laboratory records of droves of swine in which the disease appeared. From these data, we feel that a veterinarian could make a diagnosis by taking careful history.

For example: In one drove of 125 pigs, 76 died in the first three days, 23 additional animals died between the fourth and fifth days, nine died between the sixth and seventh days and 17 of the original were alive on the 12th day.

In a second drove of five litters, consisting

of 35 pigs one week of age, only six were alive. In seven other litters of 53 pigs which were three weeks of age, only one was dead.

On a third farm, nine sows farrowed 70 pigs all within a period of nine hours. Fifty per cent of those died six to eight hours after birth. The other 50% died within the next 30 hours. This illustrates the rapidity in which an entire herd may be wiped out.

Chart 1 illustrate events in a typical herd. Notice dates, the number of pigs per litter, and the death rate according to age.

Chart 1

Sow No.	Date Farrow	No. Pigs	Results
1	Feb. 17	6	All dead — 3 days
2	" 21	7	" " — 6 days
3	" 22	8	" " — 6-7 days
4	" 22	7	" " — 7 days
5	" 23	5	" " — 7 days
6	" 24	9	" " — 4 days
7	" 24	8	" " — 3-4 days
8	" 26	6	All O.K.
9	" 26	7	All O.K.
10	" 26	8	All dead — 6 days
11	" 26	5	" " — 3-4 days
12	" 27	6	" " — 5 days
13	" 27	9	" " — 4-5 days
14	" 28	10	" " — 2 days
15	Mar. 2	8	" " — 3-4 days
16	" 2	8	" " — 4 days
17	" 3	6	1 alive
18	" 3	7	2 alive
19	" 4	7	Sick — March 7
20	" 6	10	Sick — March 10

All of the above sows were gilts. Four different boars were used. Nine of the above were gilts purchased from one owner. All of their pigs died and these gilts were the first to farrow. There were six older sows due to farrow at a later date. None of their pigs sickened or died. These sows must have contracted the disease during the epidemic and acquired sufficient resistance so that their offspring did not contract the disease.

Charts 2 and 3 illustrate the expected death rates regardless of treatment on which records were kept.

One is able to tell at a glance at these charts how ineffective treatment would be and what percentage of survival could be expected under any treatment program.

Summary

Transmissible gastroenteritis may be confused with white scours, hypoglycemia, navel infection, anemia, uremia, hog cholera, bacterial infections, nutritional enteritis, vitamin deficiencies, virus diseases, and toxic agents.

Cardinal symptoms are fetid diarrhea, squealing as if the pig were starving or in pain, vomiting, yellow discoloration of the skin, inappetence, depression, emaciation, coma, rough hair coat, dehydration, and rapid deaths. In older pigs, the disease produces an acute diarrhea, non-fatal gastroenteritis upset lasting about three to four days. Deaths may occur but usually are not the rule.

Pathogenic organisms usually associated with some other enteric conditions in swine have not been isolated with any degree of regularity.

The pathologic changes in baby pigs consist of an inflammatory condition of the small intestines and stomach mucosa; to a lesser degree in the large intestines. A general congestion of the gastrointestinal tract is present with hyperemia of the mesenteric lymph glands. The stomach is often well filled with curdled milk. Often there is a large amount of fluid in the intestines.

Real progress has been made in the study of this specific disease. There is some information available which indicates that only an occasional animal is a carrier, perhaps only a temporary carrier.

Wide dispersion of the sows and gilts once the disease appears on a farm is the recommended general procedure.

Outbreaks have been observed to occur following the introduction of exposed or pregnant sows into a herd. Many sows that have lost their pigs may be rebred after which they usually farrow normal litters. Continuous farrowings may perpetuate the disease.

One attack does not cause animals to become resistant to later attacks.

No spectacular results are to be expected in the treatment of transmissible gastroenteritis under present conditions, but the common sense use of a number of simple measures may prevent some complications.

Chart 2

No. Pigs	Age	% Deaths
40	1 to 3 days	99
80	4 to 14 days	25
57	15 to 28 days	7.5
39	29 to 42 days	2.+

Chart 3

No. Pigs	Age	% Deaths
62	6 to 10 days	67
45	10 to 18 days	30
97	20 to 35 days	3
122	1 to 5 days	100

Certain facts have been established. They are: Virus persists for four to eight weeks, no inclusions bodies have been found in tissues from diseased pigs, there is no virus in the urine of the infected pigs, it is not always pos-

sible to transmit the disease by injections of blood, virus thus far has not been adapted to chick embryos. We hope that it will grow in tissue culture.

Recommendations for preventive measure are paramount among many relating to transmissible gastroenteritis.

REFERENCES

1. Hurt, L. M., 10th Ann. Rept., Los Angeles County Livestock Dept., 1935.
2. Hurt, L. M., 12th Ann. Rept., Los Angeles County Livestock Dept., 1936.
3. Hurt, L. M., 13th Ann. Rept., Los Angeles County Livestock Dept., 1936-1937.
4. Hurt, L. M., 15th Ann. Rept., Los Angeles County Livestock Dept., 1938-1939.
5. Doyle, L. P., and Hutchings, L. M., A Transmissible Gastroenteritis in Pigs. *Jour. Am. Vet. Med. Assn.*, 108:257 (Apr.), 1946.
6. Koen, J. S., Personal Communication, 1947.
7. Posey, Fred H., Quick Cure for Pig Disease Unlikely. *Columbus Dispatch*, April 3, 1947.
8. ....., *Ohio Dispatch*, April 1, 1947.
9. Hastings, C. C., Gastroenteritis of Swine. *Cornell Vet.*, 37:129 (Apr.), 1947.
10. Ray, J. D., Gasteroenteritis. *Vet Med.*, 42:298 (Aug.), 1947.
11. Hutchings, L. M., Gasteroenteritis in Young Pigs. *Vet. Med.*, 42:297 (Aug.), 1947.
12. McNutt, S. H., and Dacorso, Paulo., Proc. U.S.L.S.A., Dec. 1947, p. 106-109.
13. Doyle, L. P., Transmissible Gastroenteritis in Swine. Proc. U.S.L.S.A., Dec. 1947, p. 100-102.
14. Gordon, Irving, Ingraham, Hollis S., Karns, Robert F., Transmission of Epidemic Gastroenteritis to Human Volunteers by Oral Administration of Fecal Filtrates. *Jour. Exp. Med.*, 86:409, 1947.
15. Whitehair, C. K., Grummer, R. H., Phillips, P. H., Bohstedt, G., and McNutt, S. H., Gastroenteritis of Pigs. *Cornell Vet.*, 38:24 (Jan.), 1948.
16. Feenstra, E. S., Thorp, Frank, Jr., Gray, M. L., and McMillen, W. N., Transmissible Gastrenteritis of Baby Pigs. *Jour. Am. Vet. Med. Assn.*, 113:573 (Dec.), 1948.
17. Bay, Wm. W., Hutchings, L. M., Doyle, L. P., Brunnell, Doris E., Transmissible Gastroenteritis in Baby Pigs. *Jour. Am. Vet. Med. Assn.*, 115:245 (Oct.), 1949.
18. Gastroenteritis of Swine. Rept. Chief BAI, 1949, p. 43-44.
19. Heidebrecht, A.A., Ross, O. B. Whitehair, C. K., and MacVicar, R. W., The Toxicity and Nutritional Adequacy of Milk from Sows Suckling pigs Showing Symptoms of Baby Pig Disease. *Jour. Am. Vet. Med. Assn.*, 117:147 (Feb.), 1950.
20. Nelson, John M., Control of Transmissible Gastro Enteritis by Inoculation with a Field Culture. No. 926, May 1954, p. 387-388. *Jour. Am. Vet. Med. Assn.*, 124:387 (May), 1954.
21. Kernkamp, H. C. H., Infectious Gastroenteritis and Colibacillosis in Pigs. *N. Am. Vet.*, 31:336 (May), 1950.
22. Hutchings, L. M., Infectious Diseases of Young Pigs. *Vet. Med.*, 45:273 (July), 1950.
23. Kernkamp, H. C. H., Differentiating Physical Characteristics of Hypoglycemia, Uremia-toxemia and Transmissible Gastroenteritis in Baby Pigs. *N. Am. Vet.*, 31:729 (Nov.), 1950.
24. Quin, A. H., Gastroenteritis in Swine. *Vet. Med.*, 46:132 (Apr.), 1951.
25. Ray, J. D., Swine Diseases. *Haver-Glover Mess.*, 31:12 (May-June), 1951.
26. Doyle, L. P., Transmissible Gastroenteritis of Pigs. *N. Am. Vet.*, 32:477 (July), 1951.
27. Bay, W. W., Doyle, L. ., and Hutchings, L. M., The Pathology and Symptomatology of Transmissible Gastroenteritis. *Am. Jour. Vet. Res.*, 12:215 (July), 1951.
28. Bay, W. W., Transmissible Gastroenteritis in Swine—Field Herd Studies. *Jour. Am. Vet. Med. Assn.*, 120:283 (May), 1952.
29. Horlein, A. B., and Hubbard, E. D., Transmissible Gastroenteritis of Baby Pigs. Progress Report Vet. Research, 1952, p. 22-26.
30. Bay, W. W., Doyle, L. P., Hutchings, L. M., Some Properties of the Causative Agent of Transmissible Gastroenteritis in Swine. *Am. Jour. Vet. Res.*, 13:318 (July), 1952.
31. Young, Geo. A., Underdahl, Norman R., and Hinz, Ronald W., A Serum Neutralization Test for T.G.E. of Swine. *Cornell Vet.*, 42:561 (Oct.), 1953.
32. Lee, Kyu M., Moro, Manuel, and Baker, James A., Transmissible Gastroenteritis of Pigs. *Am. Jour. Vet. Res.*, 15:364 (July), 1954.
33. Reber, Elwood, F., and Whitehair, C. K., The Effect of Transmissible Gastroenteritis on the Metabolism of Baby Pigs. *Am. Jour. Vet. Res.*, 16:116 (Jan.), 1955.
34. Young, Geo. A., Hinz, Ronald W., and Underdahl, Norman R., Some Characteristics of Transmissible Gastroenteritis TGE in Disease Free Antibody Devoid Pigs. *Am. Jour. Vet. Res.*, 16:529 (Oct.), 1955.
35. Reber, Elwood F., and Yusken, John W., The Effect of a High Level of Dietary Sodium on the Nutrition of Baby Pigs Infected with Transmissible Gastroenteritis. *N. Am. Vet.*, 37-198 (Mar.), 1956.

▼ ▼ ▼

Clinical Use of a New Nitrofuran Dosage Form

(Continued from page 413)

3. Dodd, M. C., Hartmann, F. W., and Ward, W. C., The Local Application of Nitrofuran Compounds with Special Reference to Use on Wounds. *Surg. Gyn. Obst.*, 83:73 (July), 1946.
4. Wessels, H. P., Questions and Answers: Granular Vaginitis in Cows. *N. Am. Vet.*, 36:375 (May), 1955.
5. Lindley, D. C., and Hatfield, R. C., Observations on the Bacterial Flora of Infertile Dairy Cows. *Jour. Am. Vet. Med. Assn.*, 102:12 (Jan.), 1952.
6. Lindley, D. C., Intra-Uterine Antibiotic Therapy Postservice in Infertile Dairy Cattle. *Jour. Am. Vet. Assn.*, 124:187 (March), 1954.
7. Haubrich, W. R., Bovine Sterility. *Cornell Vet.*, 45:304 (July), 1955.
8. Schaffer, J. D., The Use of Vaginal Suppositories in Veterinary Practice. *Vet. Med.*, 45:191 (May), 1950.
9. Milks, H. J., Practical Veterinary Pharmacology, Materia Medica and Therapeutics, ed. 6, Chicago, Alex Eger Inc., 1949, p. 641-642.
10. Holder, H. G., and Mackay, E. M., The Use of Urea in the Treatment of Infected Wounds. *Jour. Am. Med. Assn.*, 108:1167 (Apr. 3), 1937.

▼ ▼ ▼

Mucosal disease of cattle has been reported in 20 states and Canada since it was first recognized in Iowa in 1953.

The Brucellosis Eradication Program In 12 Illinois State-Owned Dairy Herds†

H. S. BRYAN, D.V.M., Ph.D., and ROBERT GRAHAM, B.S., D.V.M., Urbana, Illinois

THE accelerated program to eradicate brucellosis from cattle in the United States is currently in full swing. In Illinois, the milk ring test and the blood serum agglutination test are being used to detect infected herds and animals. The Federal-State Plan A program[1] for the control of brucellosis is advocated. In this program, infected animals are slaughtered and vaccination of calves four to eight months of age with strain 19 vaccine is optional. The goal of the accelerated program is complete eradication of bovine brucellosis.

Vaccination of calves against brucellosis is frequently advocated as the best means for controlling this disease. Strain 19 vaccine produces a significant degree of resistance but not an absolute immunity to *Brucella abortus* infection. In our experiments[2], 35% of the strain 19 vaccinated heifers aborted or had abnormal births when challenged with virulent *Br. abortus* organisms during the midgestation period of the first pregnancy. Also the persistent reactor or suspicious agglutinin titers which occasionally follow the administration of strain 19 vaccine have disappointed some veterinarians and cattle owners. Since strain 19-induced titers can not be distinguished from titers following natural infection, the work of the brucellosis disease control officials has been complicated. A brucellosis vaccine, incapable of inducing a persistent agglutinin titer and without danger of establishing infection in vaccinated animals, yet providing a significant degree of resistance against natural exposure would be desirable. Several brucellosis vaccines[3] have been tested but have failed to meet these requirements. As a result, many veterinarians advocate a program of good herd management for control and resort to vaccination only as an aid in infected herds.

The purpose of this report is to record the results obtained in 12 Illinois state-owned dairy herds in which vaccination against brucellosis was discontinued and emphasis was placed on maintenance of good herd management practices. The results noted in these herds over a six-year period are offered in support of the premise that vaccination against brucellosis may be discontinued in herds in which active cases of brucellosis have ceased to occur and herd management practices are adequate. Furthermore, it is suggested that blood testing in conjunction with good management practices are the most effective procedures in maintaining brucellosis-free herds.

Materials and Methods

The state of Illinois has maintained large herds of Holstein-Friesian cattle at 12 state institution farms for many years. A complete history regarding the methods employed for assembling and maintaining each herd in the early years is not readily available. By 1944, and probably prior to that date, symptoms of brucellosis were prevalent. Available information indicates that during the 1944-46 period, calf vaccination with strain 19 vaccine was initiated in each herd. Some selected mature cows might have been vaccinated also. Apparently a management program for the control of brucellosis was not consistently employed prior to that time. Blood testing was not practiced routinely.

During the early months of 1950 these herds were made available to the College of Veterinary Medicine for the purpose of evaluating an experimental Brucella vaccine[3]. The experimental vaccine was known not to stimulate a high or persistent level of detectable Brucella antibodies, but its protective value was in doubt. From 1950 until the middle of 1953, the experimental vaccine was used to vaccinate all calves between the ages of four to eight months. Through a misunderstanding a few heifer calves in two of the herds were vac-

†From the Department of Veterinary Pathology and Hygiene, College of Veterinary Medicine, and the Agricultural Experiment Station, University of Illinois, Urbana.

The authors gratefully acknowledge the cooperation and assistance of Mr. Stillman J. Stanard, Illinois Director of Agriculture; Dr. A. K. Merriman, Illinois Superintendent of the Division of Livestock Industry, as well as their predecessors; Mr. Leslie W. Heiser, Illinois Superintendent of the Division of Soil Conservation; and all superintendents, wardens, head farmers, dairymen, and veterinarians associated with the Illinois State Institutional Dairy Herds. Without their help these observations could not have been made.

cinated with strain 19 vaccine during this period. Subsequent data obtained in another experiment[2] revealed the experimental vaccine as ineffective in preventing brucellosis. Consequently in the middle of 1953 all vaccinations against brucellosis were discontinued in these herds.

The management practices employed were good, but no better than those practiced by many other dairymen in Illinois. Perhaps the major difference was that these herds were maintained as closed units. However, it was noted that some cattle were moved from one state-owned herd to another. Rarely were new purchased animals introduced; herd replacements were raised on each farm.

Since 1950, the rapid plate test for brucellosis has been used on an annual basis in each herd on all animals which were over six months of age. Prior to that time the blood test was not used consistently. In two herds no records of complete herd tests were found, while in the others the last herd tests had been made as follows: 1 in 1944, 1 in 1945, 4 in 1946, 2 in 1948, and 2 in 1949.

In the classification of the animals into negative, suspicious and reactor categories by the brucellosis agglutination test, the system as followed in the various state-federal laboratories was used. The results were interpreted as follows:

1/50	1/100	1/200	Diagnosis
—	—	—	Negative
I	—	—	Suspicious
+	I	—	Negative
+	+	I (and higher)	Reactor

This system of classification was in force until 1955. For the 1955 and 1956 blood tests strain 19 vaccinated animals for which vaccination could be verified were classified as follows:

1/50	1/100	1/200	Diagnosis
—	—	—	Negative
I	—	—	Negative
+	I	—	Suspicious
+	+	I	Suspicious
+	+	+ (and higher)	Reactor

The original system of classification was continued for unvaccinated animals and for all animals which had received injections of the experimental vaccine.

Animals classified as reactors on the blood test were slaughtered. The suspicious and negative animals were retained in each herd.

In conducting the blood test for brucellosis the official brucellosis plate test antigen as prepared and distributed by the Agricultural Research Service of the United States Department of Agriculture was used. All tests were made in the Diagnostic Laboratories of the College of Veterinary Medicine, University of Illinois.

Results

On the 1950 blood test for brucellosis, a total of 1,609 animals were tested. Of these 1,113 (69.2%) were classified as negative, 398 (24.7%) as suspicious and 98 (6.1%) as reactors. (table 1). With the exception of one herd (no. 7) reactor animals were detected in each herd. Suspicious animals were found in each herd.

TABLE 1. Illinois State-Owned Dairy Herds Brucellosis Blood Test Results for 1950

Herd No.	No. Animals Tested	Classification		
		Negative	Suspicious	Reactor
1	156	126	20	10
2	155	65	71	19
3	109	77	30	2
4	115	86	26	3
5	130	107	22	1
6	172	124	30	18
7	106	93	13	0
8	127	81	40	6
9	137	77	42	18
10	148	104	33	11
11	121	79	37	5
12	133	94	34	5
Total	1609	1113 (69.2%)	398 (24.7%)	98 (6.1%)

In 1956, six years after the beginning of the experiment, 1,670 animals were tested. Of these 1,647 (98.6%) were classified as negative and 23 (1.4%) as suspicious on the brucellosis test. (table 2). No reactor animals were disclosed.

The results of the annual blood tests for the 12 herds for each of the seven years (1950 through 1956) are summarized in table 3. The detailed results for each herd for the years 1951, 1952, 1953, 1954, and 1955 are not presented here to conserve space. Copies of the results are available on request.

Discussion

Th serological results presented suggest that creditable progress has been made in eradicating brucellosis from 12 Illinois state-owned dairy herds. A comparison of the results of the 1950 blood tests, as obtained at the beginning of this study, with the current 1956 results supports the foregoing statement of

progress. Percentagewise the number of negative animals, during this period, increased from 69.2% to 98.6%; the suspicious animals declined from 24.7% to 1.4% and the reactors declined from 6.1% to 0.

In 1956, of the 23 suspicious animals that remained in the herds, 10 (43.5%) had been vaccinated with strain 19 vaccine; this suggests residual vaccinal titers. Of the remaining 13 classified as suspicious, each had a low titer of incomplete at 1:50, except two which were incomplete at 1:100. The reason or reasons for these low titers among the unvaccinated animals was not determined but it is believed that they might be regarded as non-specific reactions to the brucellosis test.

TABLE 2. Illinois State-Owned Dairy Herds Brucellosis Blood Test Results for 1956

Herd No.	No. Animals Tested	Classification		
		Negative	Suspicious	Reactor
1	241	239	2	0
2	166	164	2	0
3	131	127	4	0
4	130	127	3	0
5	181	179	2	0
6*				
7	157	153	4	0
8	157	154	3	0
9	126	126	0	0
10	117	117	0	0
11	145	145	0	0
12	119	116	3	0
Total	1670	1647 (98.6%)	23 (1.4%)	0

*Dairy Project Discontinued During 1955.

During the 1950-56 blood testing period, marked improvement in the brucellosis status of these herds occurred at two separate times. The first noticeable gain was evident on the 1951 blood test when the percent of negative animals rose from 69.2% to 90.5% (table 3). Since strain 19 vaccinations were discontinued in 1950, it appears that the improvement noted might be traceable to the decline in residual vaccination titers. The second important gain was noticed after the 1955 annual test had been completed; the percent of negative animals rose from 92.7% to 96.6%. The most plausible explanation for this improvement was the use of the new system for the classification of strain 19 vaccinated animals.

It appears that brucellosis has been eradicated from these herds; however, further improvement in the decrease of the number of suspicious animals is desired. No reactor animals were disclosed on the most recent annual (1956) blood test.

TABLE 3. Illinois State-Owned Dairy Herds Brucellosis Blood Test Results 1950 through 1956

Year	No. Animals	Negative		Suspicious		Reactor	
		No.	%	No.	%	No.	%
1950	1609	1113	69.2	398	24.7	98	6.1
1951	1752	1586	90.5	136	7.7	30	1.8
1952	1806	1651	91.4	144	8.0	11	0.6
1953	1568	1463	93.3	99	6.3	6	0.4
1954	1680	1558	92.7	117	7.0	5	0.3
1955	1732	1673	96.6	58	3.4	1	.05
1956	1670	1647	98.6	23	1.4	0	—

It is believed that the present favorable brucellosis status of these herds was attained through a sound program of dairy cattle management. In addition to good practices which were employed, two features seem to stand out as having been most important: (1) Closed herds, and (2) annual brucellosis blood tests.

Since brucellosis was prevalent in most of these herds at one time or another the use of strain 19 vaccine on the heifer calves during the 1944-1950 period may well have lowered the activity of the disease. It is believed that a degree of protection or resistance to brucellosis could have been established in the adult animals by this procedure. This unmeasurable factor, coupled with the closed herd operations to prevent reinfection, limited the infection so that by 1950, a plan of test and slaughter without vaccination of calves appeared feasible. Even though a brucellosis-free status has been reached for these herds, the management practices which were employed to attain this goal can not be relaxed. Not until brucellosis has been eradicated from all animals in the United States can the standards of management be lowered. Meanwhile, it appears that these herds can be maintained as brucellosis-free without the aid of Brucella vaccine. While many Illinois cattle herds have benefited from strain 19 vaccine it is also apparent that other herds have been kept free of brucellosis by good methods of management alone.

Summary

The results of a brucellosis eradication program in 12 Illinois state-owned dairy herds are reported. Following a period of several years during which calf vaccination with strain 19 vaccine was employed, emphasis was placed on maintenance of good herd management practices and calf vaccinations were discontinued.

On the initial brucellosis blood test made in 1950 on 1,609 animals, 1,113 (69.2%) were classified as negative, 398 (24.7%) were suspicious, and 98 (6.1%) were reactors.

(Continued on page XXXVI)

EDITORIAL COMMENTS

Preference for Meat

Economists of the Agricultural Marketing Service point out that the per capita consumption of 66 lb. of pork last year is approximately the quantity consumed 25 years ago. Beef consumption has increased on a per capita basis for the third consecutive year to a total of 81 lb. for 1954. The newness of this situation contradicts some economic laws since consumers paid more per pound for beef than pork at a time when beef was plentiful.

Stated in another way, consumers in this country spent 3% of their income for beef. Expenditure for pork products declined from 3% in 1947 to less than 2% in 1954. Of the food dollar, a larger percentage of income gain was spent for beef rather than pork.

Explanation of this trend generally refer to the greater fat content of pork as compared to beef. Americans have employed technical advances to take much strenuous effort out of their occupation, thus decreasing need for energy and fat. The second, but no less significant reason is the lack of quality and flavor in prepared (cured and smoked) pork cuts. Hurried curing has been accomplished at the sacrifice of flavor. Old-time butchers were artisans in preparing sausages, hams, and bacon that helped start a day with zest. The modern butcher is more appearance minded than flavor-minded; unfortunate indeed for the consumer and pork producer.

Consumers have demanded, but have not gotten leaner pork cuts that tempted the appetite. Now they are forcing it by reduction in demand. Growers are clamoring for lean type breeding stock and packers have become fat conscious. The pork appetite will "pick up" as taste appeal is improved. It is reasonable to expect that such effort would strengthen the demand for pork without reducing the favorable position or demand for beef.

▼ ▼ ▼

That antibiotics tend to slow peristalsis is shown by experiments at the College of Veterinary Medicine at Illinois University. Speed of food movement through the digestive tract influences to some degree both digestion and absorption. If antibiotic supplements do function as suggested, this factor alone may influence both growth and weight gain.

Insect Pests of Livestock

Fully 400 different insects attack livestock in this country at one time during the year or another, according to the current issue of *Agricultural Research*. Collectively, they are costing growers an estimated $500,000,000. or more annually. These bite, burrow, or suck blood, thereby spreading disease and even death. Some are carriers of diseases from animals to man.

The problem of insect pests to livestock is growing because of the trend toward concentration of animals, and increased irrigation of both crop land and pastures.

Control measures fall into two groups: (1) Destruction of breeding places through good sanitary practices and use of insecticides, and (2) spraying or dipping infested animals. A spectacular control procedure differing from the two aforementioned methods which are basic and widely employed, is sterilization of male flies by use of radioactive cobalt. Pilot research on the island of Curacao has indicated that the incidence of screwworm infested wounds can be materially reduced by releasing sterilized male flies. Economic and other problems have delayed extensive trials of sterilizing male flies. Economic and other problems have delayed extensive trials of sterilizing male screwworms flies for release in the southeastern and western states where the problem is a major one.

▼ ▼ ▼

More and more credence is given to favorable weight-gain response of fattening steers whose rations are supplemented with stilbestrol. Costs vary under different feed management practice but cost reduction of $5. per hundred weight gain is not uncommon under control experimental conditions. Researchers also agree generally that difference in carcass quality between stilbestrol fed and control animals is negligible. All nutritionists are not in agreement regarding the latter point.

▼ ▼ ▼

The quesion as to what kind and how much amino acids are essential to the health of man and all classes of livestock needs to be answered.

Psychic Trauma Caused by Linguistic Meaninglessness

James Thurber, who once memorably described an uncle who died of the disease that was killing the chestnut trees that year, has made another contribution (of sorts) to scientific literature. Out of the *New Yorker* by way of *Science* magazine we learn that the long time dean of American humorists now advocates scientific investigators who call themselves psychosemanticists. Their function will be "to cope with the psychic trauma caused by linguistic meaninglessness to prevent the language from degenerating into gibberish, and to save the sanity of persons threatened by the onset of polysyllabic monstrositis." The science, Thurber points out, is not to be confused with psychosomaticists, "who study the effects of mental weather on the ramparts of the body."

Before Thurber completely disappears into the rarefied atmosphere of high-level meaninglessness, he makes one sober pronouncement that writers of veterinary literature might do well to consider. "Medical science," he writes, "has done much for humanity, but not in the area of verbal communication." Of course Thurber is kidding with his well aimed jabs at the profession's invidious distinctions, but what really hurts is the realization that this humoro-scientific criticism is not without justification. —*Charles Walters, Jr., B.Sc., M.A.*

▼ ▼ ▼

Health Physics

On March 12, the Oak Ridge Institute of Nuclear Studies opened its 11th course in veterinary radiological health exclusively for armed-forces veterinary officers.

Of two weeks' duration, the courses are presented by the ORINS Special Training Division in cooperation with the University of Tennessee-Atomic Energy Commission Agricultural Research Program. They are designed to provide indoctrination in health physics, a relatively new field of scientific endeavor closely related to the atomic-energy program. (Health physics is concerned with the prevention of damage to life or property from radiation.)

The veterinary radiological health courses have been established to supply instruction in the evaluation of problems of radiation phenomena, particularly in relation to the biological effects. Of particular importance are the possible or potential factors involved in the radioactive contamination of food-producing animals and their products. The courses include such specific topics as the effect of radiation on living cells, the internal effects of radiation on animals, the effects of radiation on foods, methods of "decontaminating" food which has been exposed to radiation and radiocontamination, the radiation syndrome in animals, radiological defense, and the uses of radioactive isotopes in research and medicine.

Directing the courses for the military is Major Max Nold of the U.S. Air Force Veterinary Corps, who is assigned to the Institute on detached service.

Further information concerning the courses may be obtained by writing Major Nold at the Special Training Division, Oak Ridge Institute of Nuclear Studies, P. O. Box 117, Oak Ridge Tennessee.

▼ ▼ ▼

Influence of Milking Schedule on Production

Research conducted at the Ruakura Experiment Station, Auckland, New Zealand has revealed no significant production loss when dairy cows were milked on an irregular schedule, according to a special report appearing in the *New York Times*, July 8, 1956.

In a test conducted a year ago, two herds of cows selected to be as nearly identical in all respects as possible, were subjected to the same management and feeding practices. One herd was milked at a regular 12-hour schedule, the other on an eight and 16-hour program, the latter allowing dairy farmers to work the daylight hours of city workers. One group was milked at 5 a.m. and 5 p.m., the other at 8 a.m. and 4 p.m.

The findings were startling and were not released, according to the report, until the experiment was repeated. Both tests indicated that the irregular milking hours caused no loss of production.

▼ ▼ ▼

Contagious Ecthyma Transmissible to Man

Apparent transmission of contagious ecthyma of sheep to man is reported by the U. S. Department of Health (*Morb. & Mort.* July 20, 1956). Two persons in contact with an infected flock developed lesions on the hands which did not respond to treatment. Spontaneous recovery occurred in about six weeks.

PRINCIPLES OF ANIMAL HEALTH

R. R. DYKSTRA, D.V.M.
Manhattan, Kansas

Chemical Poisons

An occasional question referred to this column is in regard to the matter of livestock poisoning as the result of consuming vegetation that has had a herbicide or a weed-killing compound sprayed on it. There are marketed, at present, a large number of preparations. Most are designated by alphabetical names, so that the constituents are determined only with difficulty by reading the fine print on the label.

However, there is the safeguard that the nonpoisonous ones are usually so labeled if the preparation is used in accordance with directions. On the other hand, if an excessively large amount of the alleged nonpoisonous material is ingested on vegetation usually consumed, or if the undiluted material is taken from a container, results may be fatal. There are substances harmless when consumed in small doses such as salt, aspirin, et cetera, which prove to be decidedly toxic in concentrated form or in excessive amounts. The herbicides designated NIX, SES, 2,4-D, AMMATE, 2,4,5,-T, CMU, PCP, and others are used rather extensively and are considered nonpoisonous when used according to the printed directions. On the other hand, it usually is indicated that when PMA (phenyl mercuic acetate) and potassium cyanate are used (both are popular to handle the crab grass pest on lawns) children and animals should be kept off the sprayed lawns until the first rain after spraying. In fact, it is good, safe practice to advise livestock owners not to permit grazing of sprayed areas until after a good, washing rain.

Failure to point out possible dangers to animal owners, even though a spray is harmless, is almost certain to invite blame if animal deaths due to ingested poisons occur. Some of the compounds used to kill weeds in shady areas, such as NIX (sodium isopropylxanthate), SES (2,4-dichloro-phenoxy-ethylsulphate), PCP (pentachlorophenol), are said to remain potent in the soil for considerable time. Veterinarians in the past have had experience in the poisoning of livestock following the consumption of both herbicides and insecticides when arsenic was used as an ingredient.

Late Growth of Poisonous Plants

In some sections of general drought areas there have been average or above average local rains with the result that seeds of poisonous plants that did not germinate during the spring months now appear in midsummer. In these regions cattle now suddenly find green material, it is indiscriminately consumed, and alleged poisonings are reported more frequently. It is important that suspected plants be identified correctly. It is urged that those not especially trained in this botanical field utilize the services of botanists of their respective agriculture experiment station.

▼ ▼ ▼

Vaccination for Bovine Leptospirosis

Immunization by prophylactic vaccination of cattle for leptospirosis is apparently imperfect—at least so we are informed by some practitioners. While it is generally conceded by researchers that a naturally occurring attack confers lifetime immunity, vaccines appear to stimulate less than protective immunity to mass field exposure. Single injections do not always immunize and a second booster inoculation has been observed to produce severe shock. Nor has the best time of vaccination been determined. One of the sequela of leptospirosis is premature births. Frequently practitioners are not consulted until several such abortions have taken place in brucellosis free herds. Since the leptospirosis aborting animals are convalescent, and therefore naturally immune, though still infection spreaders, it is too late for vaccination. On the other hand to vaccinate, before there is clinical clear-cut evidence of the disease, with its attendant uncertain results and hazards leaves the practitioner on the "spot" as it were. It is comforting to know that available vaccines are not capable of causing disease since they are nonliving.

▼ ▼ ▼

Since the immunity against canine distemper of puppies induced by vaccination seems to be an exceedingly variable factor most practitioners recommend "booster" vaccinations at six to eight months intervals. It is a sound practice.

VETERINARY NUTRITION

MORRIS ERDHEIM, D.V.M.
Chicago, Illinois

Vitamins and Resistance to Disease

Around the turn of the century, the scientific world was germ-conscious. At that time it was generally assumed that the diseases which could be cured by dietary means were caused by some unknown microorganisms. Subsequently, it was shown that these nutritional diseases were due to a deficiency of some nutrients.

Strict deficiency disease can readily be prevented by fortifying rations with missing dietary factors. As for infectious diseases, there is a popular concept in medical circles that good nutrition is vital to resistance. The role of vitamins in this area offers fascinating grounds for scientific investigation. We hope to touch on some of this work in this and future columns.

Vitamin A

It long has been recognized by medical men, human and veterinary, that vitamin A is needed for the maintenance of healthy mucous membranes. The healthy mucous membranes act as the "first line of defense" against many infectious disease organisms. Vitamin A deficiency results in cellular changes in the mucosa causing a diminution of this protective action. This results in a decreased resistance to infection.

Udall[1] quotes Hart as saying that when the vitamin A stores in pregnant females are depleted, dead or weak calves may be expected. The calves which live develop lung abscesses or a chronic form of pneumonia. Diarrhea is not uncommon.

Udall also refers to a report by Bruce showing the value of prepartum administration of vitamin A to cows where mortality in calves is high. The dose is 500,000 units to cows twice weekly, three weeks before calving. Udall's own experience along this line, however, was disappointing.

There is some evidence that more than minimum levels may be helpful[2]. Three groups of students receiving respectively 200,000 I.U., 4,000 I.U. of vitamin A, and corn oil were checked carefully. Seasonal incidence and severity of colds was similar in all three groups, but the duration was much shortened in the first group getting the large dose of vitamin A.

A number of reports[3, 4] indicate that blood levels of vitamin A decrease during acute infections, especially in cases of pneumonia and abscesses. However, little is known about the role of vitamin A in these infections.

Turpentine injected subcutaneously produces abscesses which resemble bacterial abscesses histologically. Sweet almond oil is said to react the same way. According to a study of Kagan[5], serums of turpentine injected rats revealed 50% decreases of vitamin A levels as compared to control animals. This is what one would expect in the presence of an acute infection. Kagan also showed that gastrointestinal absorption was not involved, but the livers of the turpentine injected animals contained less vitamin A per gram than the livers of the controls.

The administration of excess vitamin A resulted in almost identical levels in the livers of both the control and turpentine injected groups. Apparently, simulated infection does not interfere with the liver storage process of vitamin A.

The kidneys of the turpentine injected group had abnormally high concentrations of vitamin A, and in some, urine contained high levels. Vitamin A is frequently found in the urine in cases of pneumonia. The presence of vitamin A in the kidneys and urine during simulated infection suggests the presence of a detoxifying mechanism. However, the loss *via* the urinary system does not account for the total drop in vitamin A levels in the blood serum and liver.

Another vitamin A-diseases relationship might be mentioned here. Reports have been coming in from various sections[6] of the country on a coccidiosis-like condition in poultry which is caused by *Capillaria columbae*. Vitamin A is said to be the only effective therapy. Adding 6,000 units of vitamin A per pound of feed already containing a normal level of 4,500 units, controls the condition effectively within ten days. How the vitamin A works is not clear. It is felt, however, that it does not act as a vermifuge.

(Continued on page XXXVI)

VETERINARY PARASITOLOGY

A. O. FOSTER, B.A., M.A., Sc.D.
Beltsville, Maryland

Itch Mite of Sheep in South Africa

Veterinarians in Onderstepoort have encountered "Australian itch" in Merino sheep of South Africa.[4] The diagnosis, in March 1954, followed "ever increasing" reports of an "abnormal fleece condition". The parasite is presumed to be the same species, *Psorergates ovis*, that was found in Australia in December 1940[2,3] and in the United States in March 1951[1,3].

The South African report agrees with reports elsewhere on the chronicity of the disease and its apparent absence among lambs and young animals. It emphasizes, however, that "the condition is widespread in the Union". Great damage to fleece and definite skin lesions, including hyperkeratosis and inflammation, are characteristic in the long-standing infections of older sheep. It is interesting to note, in passing, that all infections so far reported have occurred in Merino sheep and that all workers found it difficult, at first, to discover and demonstrate the parasitic mites.

Inasmuch as psorergatic scabies is now recognized as a serious disease on at least two continents, we should be doubly vigilant about its occurrence in the United States. BHC is apparently ineffective but lime-sulfur, according to the Australians[6], is sufficiently effective to warrant its use. A more recent report from South Africa[5] than the one aforementioned[4] does not support the value of lime-sulfur but confirms the inefficacy of conventional BHC dips and gives valuable, although preliminary, data on trials with several acaricides. Two organic phosphates, Bayer L 13/59 and malathion, and, surprisingly, the delta and epsilon isomers of BHC were promising on the basis of *in vitro* trials.

For many reasons, the discovery of the acaricidal action of delta BHC against *Psorergates ovis* is of special significance. It must be viewed, of course, in the light of all previous emphasis that action against arthropods is attributable to the gamma isomer and the consequent preparation of this isomer in substantially pure form as lindane. Moreover, the South African report notes that the efficacy of the delta isomer was impaired in the presence of the gamma isomer, thus evidencing antagonism and indicating that present scabies treatments permit the itch mite to spread insidiously. Nevertheless, the report noted that the best dipping fluid for general use might desirably contain optimum concentrations of both the delta and gamma isomers. In dipping trials, however, it is significant to note that either 0.1% delta BHC or 0.2% malathion appeared to be "capable of curing *Psorergates ovis* infestations with a single dipping."

There is evident need for study on diagnosis and treatment, as well as for further knowledge of the occurrence and injuriousness of the condition in the United States. Veterinarians should be on the alert for it.

▼ ▼ ▼

Field Test for Ingested Toxic Insecticides

During recent years with the advent of modern insecticides, larvicides, et cetera, animals occasionaly ingest, or are alleged to have ingested, accidentally or otherwise, a toxic amount of one of these agents or a lethal dose. The veterinarian is called upon to determine the cause of the toxic symptoms. For diagnostic purposes a practical test, not in any sense a specific one, consists in collecting some rumen contents either by means of a stomach tube or during an autopsy, and smearing some of this on the inside of a beaker and permitting it to dry. Then some trapped flies are imprisoned in the beaker; these will show the characteristic symptoms, and death, if an insecticide is present.

---

[1]Bell, D. S., *et al.*, *Jour. Am. Vet. Med. Assn.*, 120:117, 1952.
[2]Carter, H. B., *Austr. Vet. Jour.*, 17:193, 1941.
[3]Davis, J. W., *Am. Jour. Vet. Res.*, 15(55):355, 1954.
[4]Fiedler, O. G. H., and duToit, R., *Jour. So. Af. Vet. Med. Assn.*, 25:21, 1954.
5. *Ibid.*, 26:231, 1955.
[6]Graham, N. P. H., *Jour. Coun. Sci. Ind. Res. Aust.*, 16:206, 1943.
[7]Womersley, H., *Rec. S. Austr. Mus.*, 7:56, 1941.

POULTRY PRACTICE PROBLEMS

W. R. HINSHAW, D.V.M., Ph.D.
Frederick, Maryland

Poultry Disease Prevention Practices

In the Jan. 1955 issue of *Veterinary Medicine* page 47 the writer outlined the Massachusetts plan for eradicating fowl typhoid. Dr. G. H. Snoeyenbos in a progress report for 1955 (U. of Mass. *Featherfax*, March 28, 1956) states that only three outbreaks of this disease occurred in 1955, and gives credit to the splendid cooperative effort of the poultrymen, and the state agencies for the success. He calls attention also to a most important factor in prevention, which is to avoid introduction by purchase of only replacement stock with an official U. S. Pullorum-Typhoid Clean or Passed rating. He also warns against purchase of started or ready-to-lay pullets unless the disease histories of the source flocks are known. From a disease prevention viewpoint it is always risky to buy started chicks or ready-to-lay pullets.

▼ ▼ ▼

Ventilation of Poultry Houses

Fan ventilation of Poultry Houses (Purdue University Agric. Ext. Leaflet 378, 1955) is recommended by experts as a valuable reference on a new approach to proper ventilation of poultry houses. It reports the joint efforts of the Purdue Agricultural Engineering and Poultry Departments to improve poultry housing as a means of increasing production at reasonable cost. Both winter and summer conditions as well as proper construction of houses for adequate fan ventilation are considered.

Air flow rates, floor space requirements, types of fans, placement of fresh air inlets and types of controls are all discussed. The leaflet is well written, and illustrated and should be a valuable addition to the poultry practitioners library.

▼ ▼ ▼

Leaflet 382, U. S. Department of Agriculture, issued in February 1955, is a brief, popular guide on how to control the fowl tick, *Argas persicus*. A spray containing 0.5% of lindane, toxaphene, or chlordane or 5% of DDT, according to this bulletin, will control these ticks.

Good Poultry Husbandry

Prof. R. S. Dearstyne, North Carolina State College Poultry Department, urges poultrymen to take time each day or several times a day to observe carefully the actions of the birds in each house or poultry yard to discover early signs of abnormalities. First signs of respiratory troubles, the beginnings of cannibalism, undue loss in weight, and early symptoms of many diseases may be discovered in time to save considerable later losses if this advice is taken seriously. It is something that you could pass on to your clients.

▼ ▼ ▼

Acronizing Stimulates Fresh Poultry Sales

The U. S. Food and Drug Administration in November 1955, gave clearance to restricted use of chlortetracycline in poultry chilling tanks to retard bacterial action. The procedure which consists of adding this antibiotic at the rate of 2.6 oz. to a 200-gallon tank of eviscerated poultry is claimed to appreciably increase the shelf life of the packed product. One manufacturer* has made available its product to processors who agree to meet their rigid sanitation and management requirements. A survey of the poultry industry has shown phenomenal results following the use of this new method of prevention of deteriorations according to *The Poultryman* (June 22, 1956).

▼ ▼ ▼

New Turkey Raising Bulletin

Kansas State Agricultural Experiment Station Bulletin 376, Jan. 1956, entitled, Growing Turkeys in Kansas, by L. F. Payne, contains up-to-date information on all phases of the subject. Although written primarily for the Kansas farmer, the information is applicable to the area at least. Diseases and parasites are only casually mentioned with reference to more complete sources of information. Management from egg production and hatching to marketing is emphasized in this well prepared and illustrated bulletin.

*The American Cyanamid Co., produces a special food grade of aureomycin® for use by poultry processors. This process is called "acronizing."

PUBLIC HEALTH

JAMES H. STEELE, D.V.M., M.P.H.
Atlanta, Georgia

Toxoplasmosis

Toxoplasmosis has been found in a large variety of animals, including dogs, cats, swine, cattle, rodents, and birds. Recent findings of Dr. David Weinman and A. H. Chandler of Yale University reveal that undercooked pork may be a vehicle of Toxoplasma. Toxoplasmosis resembles pneumonia in man but it may also cause hydrocephalus in infants. In animals the signs of disease may simulate numerous entities. Both man and animals may have mild attacks with no symptoms or signs of disease. Toxoplasmosis is a common infection today although only ten years ago it was considered rare. In some parts of the country 30 to 70% of the population in the 40 to 60 age group are infected. Normally the disease is not severe and only acute cases receive attention. Factors predisposing to acute disease are not understood.

The method of transmission is almost completely unknown. It has been assumed that the infection is conveyed by unknown means from animals to man — perhaps by an insect, by handling animals or carcasses, or by eating contaminated food.

Weinman and Chandler found that: (1) Pigs can be infected with toxoplasmosis by eating infected rodents or pork scraps; (2) the rhesus monkey, the conventional substitute for man in experiments, can acquire the disease by eating infected pork; (3) persons who have trichinosis have a proportionately higher rate of toxoplasmosis than do normal persons. Toxoplasmosis also occurs in persons who do not have trichinosis — which means that unlike trichinosis which can only be transmitted by undercooked pork, there is more than one source of toxoplasmosis. Just what the other sources might be remains to be discovered.

In addition to demonstrating that pigs and rhesus monkeys can be infected, the investigators found through various tests that the Toxoplasma organism in pork can survive the usual temperatures and periods of pork storage. It survives in a cyst-like mass called a pseudocyst, which protects it not only from freezing, but also from the effect of gastric juices. This means that the organism might enter the body through the walls of the stomach, as well as through the walls of the mouth or the respiratory tract. Cooking will destroy the cyst and the Toxoplasma, they said.

They also found several factors which would aid in the spread of the disease and make it difficult to identify. Pigs, once infected, remained so for at least a year, while rats remained infected for at least seven months. The long persistence of an organism in the tissues helps its spread, especially in situations where the organism has several carriers.

Toxoplasmosis has no fixed incubation period, which makes it impossible to trace a mass outbreak to the consumption of an article of food at a common meal. Furthermore, unlike Trichina, Toxoplasma is not readily identified in sections of infected pork because of its much smaller size and more haphazard distribution in the tissues.

These studies are being continued in areas where raw garbage feeding of swine is practiced.

Infection Among Veterinary Students

Another epidemiological study now in progress in Ohio indicates that the level of skin test positivity for toxoplasmosis is significantly higher among veterinary students than in the medical student control group. The significance of this finding is unknown; however, it is suggestive of animal-to-man transmission of the disease. It is of interest to note that the Ohio studies failed to demonstrate the existence of a conversion point, from skin negative to positive, during the four-year graduate veterinary curriculum. This could be interpreted to mean that pre-college environmental factors are responsible for the higher incidence of skin test reactors among veterinary students.

▼ ▼ ▼

Salmonella springs

A new Salmonella type from South Africa, *Salmonella springs*, isolated from a nurse affected with gastroenteritis, is reported by V. Bokkenhouser and P. R. Edwards in the *South African Journal of Medical Science*. The list of Salmonella organisms is well over 200.

MORE CALLS
FEWER MILES
BETTER SERVICE

with "DVM" 2-WAY RADIO

Sound like we're suggesting an expensive impossibility? Not at all. Motorola radio equipped veterinarians are finding they can actually *eliminate thousands* of miles of driving time every year, saving *hundreds* of dollars in travelling expenses. Their phone bills are cut way down. And they can handle *more* calls in *shorter* time, coming closer to keeping a normal working day.

Farmers appreciate radio too, because *they know* you can be reached *in emergencies* without delay. Here is extra protection that builds confidence, *and practice.* A Motorola Engineer will explain fully (without obligation) just how Motorola 2-way radio will pay for itself within a year and earn you extra time and relaxation. Write, phone or wire today.

MEMO TO WIVES

You'll be glad to know that Motorola 2-way radio will cut down on irksome phoning that cuts into your housework. When a call comes in, you needn't make a dozen calls to locate your husband—one quick radio call is all it takes. And you'll know exactly where the doctor is.

MOTOROLA *2-WAY RADIO*

MOTOROLA COMMUNICATIONS & ELECTRONICS, INC. • A Subsidiary of Motorola, Inc. • 4501 Augusta Boulevard, Chicago 51, Illinois

Classified Advertisements

Twenty-five words or less, $3.50—minimum charge; additional words, 10 cents each. Replies sent care VETERINARY MEDICINE. 50 cents additional to cover forwarding postage. Remittance must accompany order.

Names of classified advertisers using V. M. key numbers cannot be supplied. Address your inquiry to key number, care VETERINARY MEDICINE, Suite 803, Livestock Exchange Building, Kansas City 2, Missouri, and it will be promptly forwarded to the advertiser.

To assure inclusion, copy must be supplied by the 5th of the month preceding date of issue (January 5 for February issue: February 5 for March issue, etc.).

FOR SALE: Veterinary Equipment, large and small animal. Write for list. Dr. S. E. Hershey, P.O. Box 283, Charleston, West Virginia.

PHENOTHIAZINE, regular or with lead-arsenate. Powder, liquid or boluses. Sodium propionate, wheat germ oil. Our prices are much lower. Write for veterinary price lists. Livestock Chemical Co., Manufacturing Chemists, Box 765, Grand Rapids 8, Mich.

CLIPPER BLADE SHARPENING: work guaranteed. Small blade 80 cents per set, large $1.00. No C.O.D. Har-Craft Co., 621 N. Main St., Burlington, Ia.

KEEP APACE: With fast-moving dog field, all phases, thru sub'n to mo. mag. Dog World—$3 one yr., $5 two yrs. 5 yrs. $10. All breeds, all news, all dog subjects. Judy Publ'g Co., 3323 Michigan Blvd., Chicago 16.

VETERINARIAN WANTED: Extensive general practice in Illinois. Can lead to profit sharing basis. State availability, experience, and other key information. Address Box 322, care VETERINARY MEDICINE.

FOR SALE OR LEASE: Fully equipped, modern small animal hospital. Long established on principal highway; serving population of 60,000. Six room residence included if desired. Reason for selling: Health. Address: Walker France, D.V.M., Bradenton Small Animal Hospital, Bradenton, Florida.

WANTED: Dairy Practice in Wisconsion. Capable of making substantial down payment. Address Box 323, care VETERINARY MEDICINE.

WANTED: January and March, 1956 issues of VETERINARY MEDICINE. Your subscription will be advanced one month for each copy. Mail to VETERINARY MEDICINE, Suite 803 Livestock Exchange Bldg., Kansas City 2, Missouri.

VETERINARIAN: Extensive experience nutrition, sales, product development, research. Qualified for field service work, clinical investigation livestock poultry problems. Desires responsible position, high calibre ethical company. Address Box 324, care VETERINARY MEDICINE.

GEM EAR CLAMPS (patented). Acclaimed by leading veterinarians. Precision instruments designed to eliminate guesswork in ear cropping. Assures beautiful ear trim. Circular on request. Joseph J. Cleary, Chance Run Kennels, Route 3 at Route 123, Hanover, Mass. (Assinippi P.O.).

FOR SALE: Excellent location and setup for veterinarian, in expanding area near Boston, Mass. Large modern kennel building. Spacious quarters with drained concrete floor and runs. New oil furnace. Grooming room and office. Beautiful old colonial home with many fireplaces; 8 acres, business zoned, with wide frontage on two main highways. Terrific business potential. Address Box 325, care VETERINARY MEDICINE.

SPECIAL

DAIRMOL DUSTING POWDER FOR GRANULAR VAGINITIS

Antiseptic **Astringent**

"THE DAIRMOL WAY"

Compounded under the direction of veterinarians of exceptional experience. Highly recommended by leading herdsmen as the best treatment for the purpose.

Also mfrs. of LIQUID Dairmol Antiseptic and Deodorant.

DALARE ASSOCIATES

23rd and Locust Sts. PHILADELPHIA 3, PA.

VETERINARIAN WANTED

for biological production and Field Service work by leading producer of biological and pharmaceutical products. Send complete information and salary requirements in first letter. Write Box 326, Care VETERINARY MEDICINE.

▼ ▼ ▼

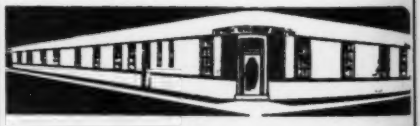
California Completes Laboratory Construction Program

Dedication ceremonies, held June 8, 1956 for recently completed new facilities to house the Sacramento Livestock and Poultry Pathology Laboratory, marked the culmination of a laboratory building program begun in 1946. There are now four such laboratories throughout California to serve livestock producers in all areas of that state.

Lieutenant Governor Harold J. Powers, who headed the group of state officials and industry representatives at the dedication, paid tribute to the California Department of Agriculture for its "farsighted livestock disease control program, which has developed as an integral part of the progress of California's ever-changing economy".

Powers further emphasized the primary po-

For the Veterinarian



DETROIT VETERINARY SUPPLY CO.

DETROIT 32, MICHIGAN

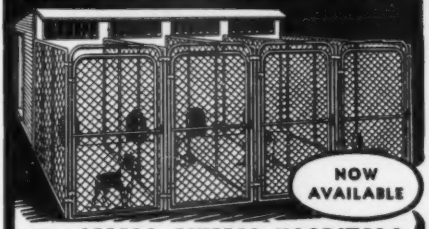
sition which the agricultural industry continues to hold in California, still the leading agricultural state in the nation despite recent growth here of manufacturing industries. "Importation of foreign livestock diseases," Powers said, "is an ever-present danger to our number one industry. In dedicating this facility today, I am sure that it will, in common with the other state laboratory services, go a long way in helping our livestock and poultry industries to reduce potential losses from disease; and thereby cutting production costs," he concluded.

Dr. Arthur G. Boyd, assistant director of the Department of Agriculture, declared that the effective disease diagnosis to the degree made possible by such a modern laboratory facility ranked in the first line of defense in the state's campaign for the finest possible livestock sanitation program. "Without such a program of effective diagnosis in this state, where the disease control program is so complex, producers could be wiped out," he said.

Dr. Thomas W. Jackson will be the veterinarian in charge of the laboratory, under Dr. W. W. Worcester, statewide supervisor of Department of Agriculture laboratories.

▼ ▼ ▼

MASON'S *New* KENNEL RUNS



NOW AVAILABLE

For SMALL ANIMAL HOSPITALS

Quickly Erected - NO POSTS REQUIRED

Can be set on concrete or wood floors or directly upon the ground, joining to, or independent of Building. Composed of strong, self-supporting Fence sections and Gate Units with GATES BUILT-IN and Lockable Latches.

FREE CATALOG

Send for Free Catalog with Low Direct Factory Prices of Kennel Fences of all kinds, Kennel Doors, Cages and Hospital Equipment.

THE MASON FENCE CO., Box 77, LEESBURG, OHIO

Treatment of bovine mastitis, while it must be done, is the least important part of a mastitis control program.—*Vet. Sci. News.*

▼ ▼ ▼

The Grain Belt Supply Company which has served you faithfully for years, is proud to take part in bringing you the new Affiliated line.

In the Shadow of *QUALITY*...

QUALITY and high standards are the pledge of Affiliated, too. These Affiliated products join the Veterinarian-Grain Belt team, which has served the livestock owner for over 35 years. You can use all these products with confidence that they will help you give the farmer protection he can depend upon.

GRAIN BELT SUPPLY COMPANY, 4902 S. 33rd St., OMAHA, NEBR.

Progressing Satisfactorily!

Twenty-three state veterinary medical associations have accepted the Continental Casualty Company Insurance Plan for their members.

Soon, a majority of all the state organizations will have their members protected against the economic hazards of sickness and accidental injuries. Why not, when the following is available.

1. A policy to every active member up to age 70, regardless of past medical history; provided required enrollment is received.
2. World Wide Protection.
3. Nation-Wide Security.
4. Non-Cancellable-individually or statewide.
5. National Committee Guidance and Protection since 1949.
6. State Association Committee has complete supervision of Plan.
7. Participation of all insured in Nation-Wide Operation experience of the Plan.
8. No elimination waivers or restrictive riders — 100% clear coverage for all, provided required enrollment is obtained.
9. The original low cost premium granted to graduating veterinarians and faculty members is available to all veterinarians enrolled in the plan, up to age 70, including impaired risks; provided required enrollment is obtained, during enrollment period to be arranged.
10. All Accidents . . . total disability covered for duration of such disability — even up to life.
11. All Sickness . . . Total Disability — irrespective of date of origin. No house confinement required — full benefits covered up to 104 weeks — two years each such disability.
12. Underwriting Company — America's No. 1 Accident and Sickness Insurance Company with a history of steady, continuous growth unparalleled in the industry.

A Reply . . .

It has been said that "we never hear anything but the good features of the Continental 'Silent Partner' policies. What are the bad features?"

Reply: The only exclusions are war, military service, suicide, pregnancy and flying other than as a fare-paying passenger on a commercial air line between established airports. (Pregnancy is covered for dependent spouse after insurance is in force for nine months as provided for under the hospital and surgical schedule coverage).

We urge the fullest investigation of any purported failure on the part of Continental Casualty Company to pay claims or to treat claimants fairly.

Silent Partner Associates, Inc.
Veterinary Department
P. O. Box 824
Evanston, Illinois

Joins Texas Faculty

Dr. C. W. Schulz (KSC '34) who has been in general practice at Jefferson City, Missouri, for 18 years, has joined the faculty of the School of Veterinary Medicine at the A. & M. College of Texas. As professor in charge of

Dr. C. W. Schulz

clinics, Doctor Schulz will direct the large animal clinic, the small animal clinic, and the ambulatory clinic. In announcing Doctor Schulz' appointment, Dean W. W. Armistead said that 10 new faculty and staff positions are being added at the Texas school as part of a comprehensive improvement program.

LOOK
to us for

PHENOTHIAZINE AND PHENOTHIAZINE-LEAD ARSENATE

POWDER, wettable: 1#—$8.50/dz., 10#—$6.30, 25#—$15.50, 100#—$52.00, 150#—$73.50

BOLUSES: 12½ gm. $3.35/hundred, 8 gm. $2.90

WHEAT GERM OIL: $13.60/gal., $3.60/qt., $2.10/pt.

SODIUM PROPIONATE NF: 5#—$3.60, 10#—$6.75, 25#—$15.75

SULFA DRUGS: Powder, tablets & boluses.

LIVESTOCK CHEMICAL CO.
Manufacturing Chemists — Since 1939
Box S-765 Grand Rapids 8, Mich.

M·A·C

Quick relief for Bone, Bursal or Tendon Lameness
Single Bottle.....$2.00
3 and 1 free.....5.00
6 and 2 free.....9.00
12 and 4 free.....17.00
24 and 4 free.....28.00

CARTER-LUFF CHEMICAL CO.
Hudson, N. Y.

PEDRICK LABORATORIES, SAND SPRINGS, OKLAHOMA

Please send ☐ Samples ☐ Literature of the NEW PRO Brand Animal Foods. 3

Dr._____

Address_____

City_____ State_____

Laboratory Service for Veterinarians

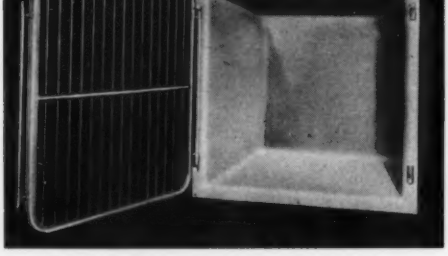
These laboratories have been established to aid veterinarians in the diagnosis of obscure as well as common ailments in large and small animals. The chief aim of our staff is to give quick and accurate diagnosis at all times.

Our service includes fecal examinations, anti-biotic sensitivity tests, urinalyses, blood counts, tissue sections, bacteriological cultures, cultures for ringworm and blood chemistry. It is designed to assist owners and breeders of stock of all kinds including dogs, cats, horses, cattle, poultry, hogs and sheep.

Sample containers and price list on request.

VETERINARY DIAGNOSTIC LABORATORIES

220 East 23rd St., New York 10, N.Y.



The ORIGINAL GLASS-PLASTIC CAGE

Now better than ever

Before you install new cages WRITE TODAY for complete information on these modern cages by Kirschner . . . time tested—molded, seamless construction, minimum maintenance. Equipped with the door built to last a life time.

Kirschner

MANUFACTURING COMPANY
Vashon, Washington

Action by Veterinary Group on Fluoridation of Public Water Supply

A resolution favoring the fluoridation of the public water supply was voted at the annual meeting of the North Carolina State Veterinary Association held in Greensboro on June 26-27, 1956. The resolution gave assurances that such treatment of drinking water, advocated to reduce incidence of dental cavities particularly in children, was not harmful in any way to the health of fish, pet and domestic animals.

Newly elected officers to serve the North Carolina group include: Dr. R. L. Williams, Raleigh, president; Dr. D. C. Beard, Concord, president-elect; Dr. B. H. Kinsey, vice president; and Dr. C. J. Lange, Greensboro, secretary-treasurer.

▼ ▼ ▼

Brucellosis Eradication Program

(Continued from page 443)

Six years later in 1956, 1,670 animals were tested and classified as follows: 1,647 (98.6%) were negative, 23 (1.4%) were suspicious and none were reactors.

A sound program of dairy cattle management including maintenance of closed herds, and annual brucellosis blood tests was employed to reach the brucellosis-free goal.

REFERENCES

1. Regulations of the Illinois Department of Agriculture, Division of Livestock Industry, Springfield. Effective May 23, 1954, pp. 20-23.
2. Bryan, H. S., Studies on Bovine Brucellosis Immunization, Controlled Experiments with B.A.I. Strain 19, Huddleson's Mucoid and Other Brucella Vaccines. Thesis, University of Illinois, 1953.
3. Graham, Robert, Unpublished data.

▼ ▼ ▼

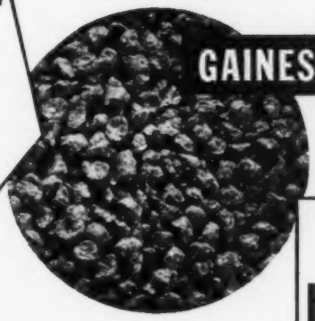
Veterinary Nutrition

(Continued from page 447)

REFERENCES

1. Udall, D. H., Practice of Veterinary Medicine, 5th ed., Ithaca, N. Y., pp. 150-151.
2. Shibley, G. L., and Spies, T. D., Effect of Vitamin A on Common Cold. *Jour. Am. Med. Assn.*, 103:2021 (Dec.), 1934.
3. Shank, R. E., Coburn, A. F., Moore, L. V., and Hoagland, C. L., Level of Vitamin A and Carotene in Plasma of Rheumatic Subjects. *Jour. Clin. Invest.*, 23:289 (May), 1944.
4. Jacobs, A. L., Leitner, Z. A., Moore, T. and Sharman, I. M., Vitamin A in Rheumatic Fever. *Jour. Clin. Nutrition*, 2:155 (May-June), 1954.
5. Kagan, B. M., Observations on Infections and Certain Vitamins. *Ann. N. Y. Acad. Sci.*, 63:214 (Oct.), 1955.
6. Feedstuffs, June 30, 1956, p. 4.

the big difference here...



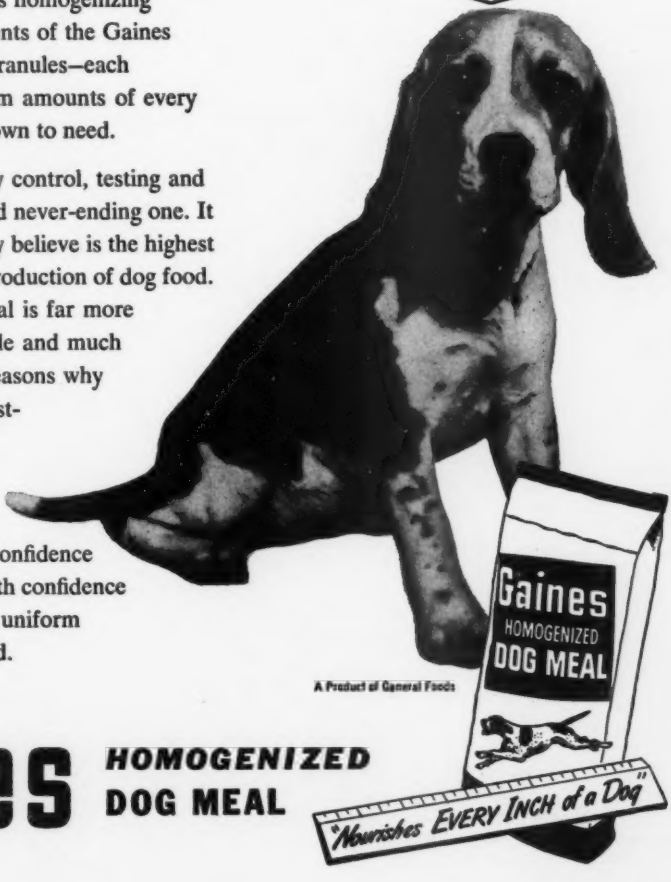
makes a big difference here...

Yes, Gaines makes the difference

because the special Gaines homogenizing process combines ingredients of the Gaines formula into appetizing granules—each granule containing uniform amounts of every food element dogs are known to need.

Gaines program of quality control, testing and research is an exacting and never-ending one. It results in what we honestly believe is the highest standard possible in the production of dog food. Gaines Homogenized Meal is far more assimilable, more palatable and much easier to feed . . . good reasons why Gaines is America's largest-selling dog meal.

Gaines indeed makes the difference . . . you can use Gaines with confidence . . . recommend Gaines with confidence . . . because complete and uniform nourishment is guaranteed.



A Product of General Foods

Gaines HOMOGENIZED DOG MEAL

VitamADE

The practitioners aid in preventing and overcoming many conditions which produce "weak, run-down" calves.

VitamADE is advantageous in cows, ewes and sows exhibiting lack of vigor as reflected in low fertility, stillbirths and deformed or weak offspring.

When the newborn cannot get up to nurse within 2 or 3 hours, **VitamADE** will often turn the trick.

Each cc supplies:

Vitamin A	100,000 units
Vitamin D_2	100,000 units
Vitamin E	10 mg.

30cc vial..... 2.65 6 vials..... 15.00

Pharmaceutical Manufacturers to the Veterinary Profession - Since 1910

CURTS laboratories

KANSAS CITY, KANSAS

Well Groomed

You'll do better with *the Veterinarian's Clipper*

Oster®

Customers like their pets to be clipped and groomed with the Oster. It's smoother, quieter . . . keeps animals relaxed and easy to handle. With six different blades for every type of clipping and surgical shaving.

JOHN OSTER MANUFACTURING CO.
Dept. L, 5025 N. Lydell Avenue
Milwaukee 17, Wisconsin, U.S.A.

Dr. John L. Kixmiller

1890-1956

Dr. John L. Kixmiller, veterinary consultant to the Pitman-Moore Company, died July 12, 1956 in Indianapolis after an illness of several months.

Doctor Kixmiller received his professional training at the Indiana Veterinary College from which he graduated in 1915. He practiced in Logansport, Ind. until 1927, when he became engaged in biological production at the Pitman-

Dr. John L. Kixmiller

Moore laboratories near Zionsville. His studies and contributions in the field of biological production were distinguished and contributed toward refinements and perfections of these useful veterinary prophylactic and treatment agents.

A member of the Indiana Veterinary Medical Association since 1919, he served as president of that group in 1922. During recent years he was Indiana resident secretary of the American Veterinary Medical Association. He is survived by his widow, a son, and daughter.

▼ ▼ ▼

Ames, Iowa Selected for Animal Disease Research Laboratory

Iowa State College, Ames has been chosen as the site of the new $18,000,000. USDA Animal Disease Research Laboratory. The site was chosen by a ten-man Committee headed by Mr. Don Collins, president of the American National Cattlemen's Association. The Committee met in St. Louis on June 27, 1956 to receive applications and then visited a number of the more promising sites. Requirements for the location included proximity to both an agricultural school and a veterinary school.

Highly effective in

treating dermatoses

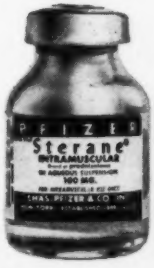
STERANE® INTRAMUSCULAR-VETERINARY

BRAND OF PREDNISOLONE

1. Relieves pruritus—"Prednisolone [Sterane] breaks the scratch reflex pattern."[1]

2. Reduces inflammation—"Prednisolone [Sterane] is the steroid of choice in dermatology where systemic corticosteroid therapy is indicated."[2]

3. Promotes healing—"Administration of steroids in pharmacological amounts . . . actually accelerates healing."[3]



Supplied: Vials of 10 cc. Aqueous Suspension, each cc. containing 10 mg. crystalline prednisolone.

Also available: Sterane Tablets 5 mg., bottles of 20 and 100; 1 mg., bottles of 100.

1. Brodkey, M. A.: J. Omaha Mid-West Clin. Soc. *17*:32, 1956. 2. Goodman, L., et al.: J. Invest. Dermat. *25*:75, 1955. 3. Arnetsen, J.: Semana méd. *1*:869, 1951.

Pfizer

Department of Veterinary Medicine
PFIZER LABORATORIES
Division, Chas. Pfizer & Co., Inc.
Brooklyn 6, N. Y.

THERAPOGEN

the proven effective germicidal agent

You'll find THERAPOGEN virtually free of side effects and toxicity. Its completely effective yet mild cleansing action has been found excellent for obstetrical work by veterinarians for many of the finest horse breeding farms in Kentucky. Inexpensive THERAPOGEN may be ideal for your needs, also.

Write, wire or call today for samples, literature and the name of your nearest distributor.

THEO. MEYER Est.

213 SO. 10TH ST., PHILA. 7, PA.

▼ ▼ ▼

Experimental results and clinical experience have demonstrated the prompt anti-inflammatory effect of hydrocortisone, according to scientists of the Upjohn Company. Advantage has been taken of these findings by the manufacturers by combining hydrocortisone, produced by a fermentation process, with a combination of antibiotics designed to control the major micro-organisms known to be associated with bovine mastitis. The new compound is made available to veterinarians under the brand name teatube-corbiot®.

can help stop losses from milk rejections and the slaughter of good cows. Write TODAY for a full size box — FREE.

Sterling Research Corp.

Dairy Div. VM. Sidway Bldg. Buffalo, 3, N. Y.

Newly Appointed Head of Norden Professional Services

Dr. William H. Beckenhauer, formerly a member of the Colorado A. & M. College staff, has joined Norden Laboratories as head of professional services and assistant to Dr. Carl J. Norden, Jr., director of biological production and research.

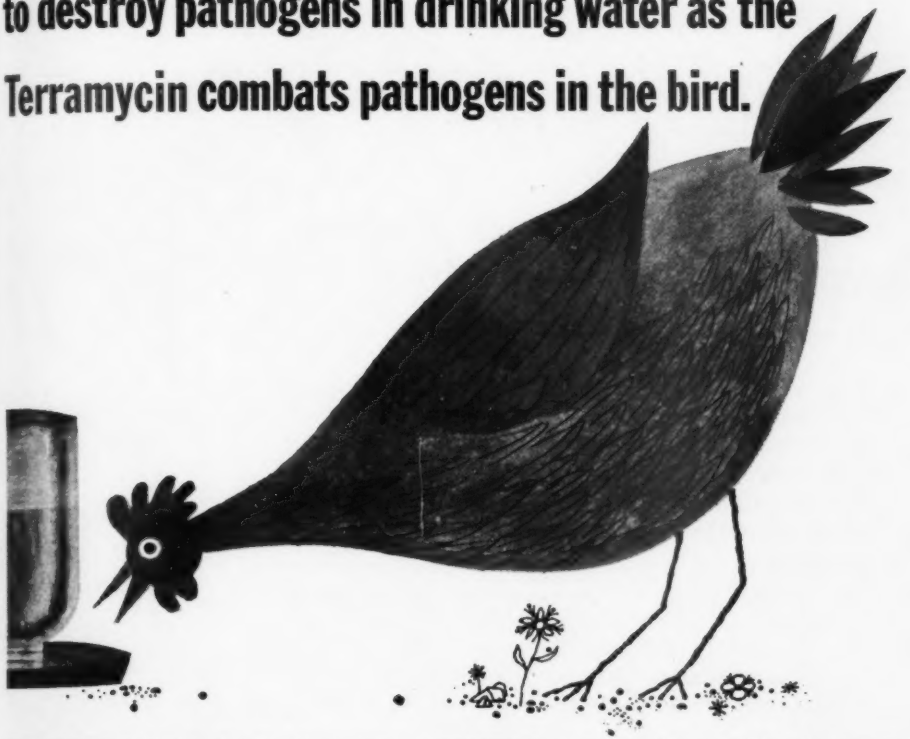
Dr. William H. Beckenhauer

A native of Faulkton, South Dakota, Doctor Beckenhauer received the B.S. and D.V.M. degrees in 1951 from Kansas State College. Following two years experience in large and small animal practice, he joined the clinic staff of the Colorado school. He received an M.S. degree there in June.

GIVE

Through YOUR
UNITED COMMUNITY CAMPAIGN

Now better than ever! Terramycin®* Poultry Formula now contains Anti-germ 77† (benzethonium chloride) to destroy pathogens in drinking water as the Terramycin combats pathogens in the bird.



ANTI-GERM 77 disinfects the drinking water to prevent the water-borne spread of fowl cholera, fowl typhoid, pullorum, paratyphoid, infectious diarrhea, enteritis, and other bacterial infections.

TERRAMYCIN exerts its well-proved broad-spectrum effect in the prevention, treatment, or management of blue comb, CRD, hexamitiasis, and infectious synovitis, and in the stimulation of healthy growth and egg production.

Terramycin Poultry Formula

Each pound represents 25 Gm. of oxytetracycline hydrochloride activity and 25 Gm. of benzethonium chloride (iso-octyl phenoxyethoxyethyl dimethyl benzyl ammonium chloride). Available in ¼ lb., 1 lb., and 5 lb. jars. ***Highly concentrated... completely soluble.***

*Brand of oxytetracycline
†Trademark

Pfizer

Department of Veterinary Medicine, PFIZER LABORATORIES, *Division, Chas. Pfizer & Co., Inc.*, Brooklyn 6, N.Y.

Like Veterinary Practice, Animal Nutrition is a Science...

Like veterinary practice, animal nutrition is a science. That's why Purina has maintained biological laboratories to study the nutritional value of feedstuffs for thirty-four years. That's also the reason Purina has three research farms where the findings of the laboratories are tested under practical conditions.

Purina Research was among the first to furnish complete rations for poultry and livestock containing all the nutritional elements for growth and production. At the same time Purina Research makes possible nutritionally correct Chow supplements to blend with home-grown grains of all types and of varying qualities.

Proper nutrition plays a big part in maintaining healthy animals, and healthy animals are proof of your professional skill. The Purina Dealer at the Store with the Checkerboard Sign serves farm folks with good nutrition in the Checkerboard Bag. And he also recommends your services in keeping disease and parasite losses to a minimum.

RALSTON PURINA COMPANY
ST. LOUIS, MISSOURI

Special INTRODUCTORY OFFER

TWO POUNDS VISTREPCIN **FREE** WITH EVERY 10 LBS. PURCHASED

Vistrepcin

PATENT PENDING

A highly dispersible drinking water additive that can be used at both nutritional and treatment levels for swine, poultry and calves.

EACH POUND CONTAINS:

Procaine Penicillin G	1,000,000 Units
Streptomycin Sulfate (as base)	3.0 Gms.
Riboflavin	400.0 mgs.
Calcium pantothenate	600.0 mgs.
Niacin	1,400.0 mgs.
Vitamin B_{12} Activity	1,000.0 mcgs.
Vitamin A (palmitate oil)	100,000 U. S. P. Units
Vitamin D_3	100,000 I. C. Units

(In an inert base.)

INDICATIONS: Bacterial swine enteritis, diarrhetic bacterial calf scours, chronic respiratory disease and blue comb in poultry. May also be used to maintain weight gains by stimulating feed intake.

10-1 pound bottles
or 2-5 pound bottles
} only $21.50 ($2.15 per lb.)

PLUS 2 POUNDS FREE

THIS BRINGS THE PRICE PER POUND DOWN TO $1.79

TRY THE TWO POUNDS, AND RETURN THE TEN POUNDS FOR A FULL REFUND IF YOU ARE NOT COMPLETELY SATISFIED.

ADDITIONAL SAVINGS THROUGH QUANTITY BUYING

30 Pounds 3%
50 Pounds 5%
100 Pounds 10%

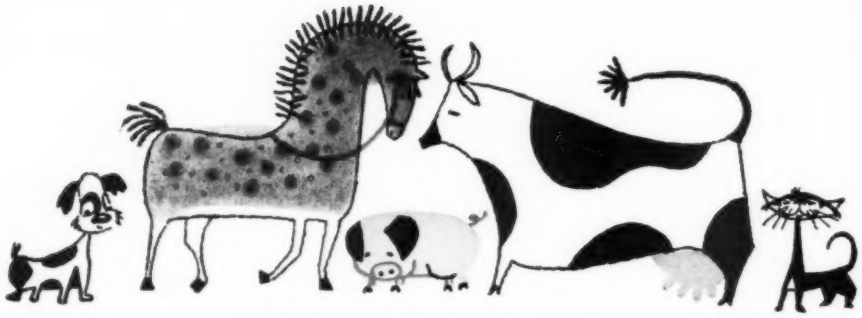
Two Pounds FREE With Each 10 Pounds Purchased

FILL OUT THIS FORM AND MAIL TO: **Diamond Laboratories**
BOX 863 DES MOINES, IOWA

Indicate quantity in multiples of 10 pounds. (Do not include free bottles.)

..... 1 Pound Bottles
..... 5 Pound Bottles

NAME.....
STREET.....
CITY..... STATE.....



in any kind of bleeding...
"exceptionally effective"[1]

KOAGAMIN® parenteral hemostat

Proved Again by New Reports on 1507 Animals

Use	Number of Animals	Cause of Bleeding	Advantages of KOAGAMIN
to stop bleeding	534 small animals	accident	satisfactory results in 90% of cases[1]
	372 large and small animals	miscellaneous	in many cases bleeding arrested by initial dose[1]
to prevent bleeding	310 dogs	surgery	clearer operative field[1]
	106 dogs and cats	dental extraction	no untoward reactions[1]
	185 aged dogs	surgery	an important drug for routine use in all surgical procedures[2]

1. Rachman, M., and Frucht, T. R.: Vet. Med. *49*:341, 1954.
2. Sternfels, M.: Vet. Med. *50*:82, 1955.

KOAGAMIN, an aqueous solution of oxalic and malonic acids for parenteral use, is supplied in 20-cc. diaphragm-stoppered vials.

Chatham

CHATHAM PHARMACEUTICALS, INC • NEWARK 2, NEW JERSEY

Distributed in Canada by Austin Laboratories, Limited, Guelph, Ontario

TOTAMIN

T. M. Reg.

- Amino Acids
- Minerals and Vitamins

SOLD THROUGH THE VETERINARIAN

Write for an illustrated folder today or ask your distributor.

NUTRITIONAL MINERALS

Box 505, 404 E. 12th St.

Sioux Falls, S. Dak.

Pet Food Manufacturers Announce Convention Program

Dr. Wayne Riser, secretary of the American Animal Hospital Association and small animal specialist at Skokie, Ill., will deliver the opening address before the second annual convention of the American Pet Food Manufacturers, a division of the American Feed Manufacturers Association, to be held at the Drake Hotel in Chicago on Sept. 20-21, 1956. Doctor Riser's address will be Prepared Pet Foods and the Veterinarian.

California Association

The 68th annual convention of the California State Veterinary Medical Association, June 11-13, at the Hotel Statler, Los Angeles, was one of the largest attended of all the association's summer meetings.

The president's banquet broke all records for attendance. Guest of honor was A.V.M.A. President Dean Floyd Cross, who was presented with an engraved tray bearing the inscription: "To Dr. Floyd Cross, as a tribute to a fine man and an excellent President of the American Veterinary Medical Association. Presented by the California State Veterinary sociation, June, 1956."

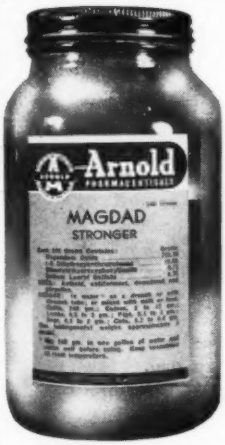
The 1957 meeting will be held in Santa Barbara.

▾ ▾ ▾

Tests conducted by entomologists at both the Kerrville, Tex. and Cornwallis, Ore. experiment stations, on new systemic insecticides for the control of cattle grubs are reported as "encouraging."

▾ ▾ ▾

Disease control officials of the Netherlands report that the entire cattle population (3,000,000 head) in that country is now tuberculosis free.



240 Gm. Jar
Also available
in 25 lb. Drums

- **For use in all domestic animals as an antacid, anti-ferment, demulcent, and evacuant of the digestive tract.**

MAGDAD STRONGER

NEW FORMULA

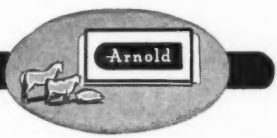
MAGDAD combines the therapeutic activities of Magnesium Oxide, Dihydroxyanthraquinone and Acetphenolisatin (non-toxic, non-irritating, stimulating laxatives), and Sodium Lauryl Sulfate, a dispersing agent which favors penetration, wetting, softening and evacuation of the solid masses found in indigestion and constipation. A free-flowing powder, MAGDAD may be administered on feed, as a drench, with stomach tube or injected into the rumen.

Immediate, careful shipment.

Write For Our Catalog

ARNOLD LABORATORIES

NEW CASTLE, INDIANA



NEW HELP IN MANAGING

SWINE ENTERITIS:

RQ-20

ARMOUR

EASY TO ADMINISTER, EASY TO REGULATE FEED ADDITIVE:

RQ-20 (Armour) contains 20% trimethylalkyl-ammonium stearate, in 80% steamed bone meal. RQ-20 alters intestinal environment favorably, so that it is effective in controlling the symptoms of bacterial enteritis in swine. RQ-20 minimizes stunting effects.

INDICATIONS:

1. **As a growth promotant, in poultry and swine rations.**
2. **As a primary treatment for swine bacterial enteritis in herds showing no systemic reaction.**
3. **As a complementary treatment for swine bacterial enteritis in herds showing systemic reactions.**
4. **To minimize relapses.**
5. **To minimize stunting effects following the outbreak of systemic diseases.**

VETERINARY ARMOUR **LABORATORIES**

Kankakee, Illinois

now you can prevent relapses in milk fever . . . PARTEROL*

WHAT IS PARTEROL?

Parterol is an oil-soluble steroid obtained by irradiating ergosterol.

WHAT WILL IT DO?

Parterol has specific action on blood calcium. Intramuscular or oral doses produce a rise of calcium in the blood and tissue.

HOW DOES IT RAISE THE BLOOD CALCIUM LEVEL?

By supplementing the hormone secreted by the parathyroid glands. This calcium-raising action of Parterol is produced by mobilizing calcium stored in the bones and increasing the absorption of calcium from the intestinal tract.

INDICATION AND DOSAGE:

To prevent relapses in milk fever by supplementing the parathyroid hormone during periods of stress on the calcium-regulating mechanisms due to increased demand for calcium at parturition. After treatment with calcium, Parterol should be given at the rate of 10 mg. per cow.

To prevent milk fever by regulating the calcium blood and tissue level at the critical calcium-utilization period at parturition. Parterol should be given 24 hours prior to parturition in a dosage of 10 mg.

PACKAGING:

Parterol is supplied in 30-cc. sterile vials. Each cc. contains 2.5 mg. Dihydrotachysterol in oil.

For further information write

S. E. MASSENGILL COMPANY

Veterinary Division

Veterinary Division
Bristol, Tennessee

*Patent Applied for

F.F.F.

(FAY'S FUNGICIDAL FORMULA)

THE NON-TOXIC FUNGICIDE and BACTERICIDE

for large and small animals

Sold Exclusively to the Veterinary Profession

NOW — in NON-ALCOHOLIC form, too. ORDER a gallon or quart from your supplier. PLEASE SPECIFY . . . NON-ALCOHOLIC OR REGULAR.

TRY IT generously and if not satisfied, return the unused portion to your supplier and receive FULL CREDIT.

Leaflet will be sent on request.

FAY'S PROFESSIONAL PRODUCTS CO.
NEW YORK 1, N. Y.

Veterinarian of the Year

Dr. Claude D. Grinnells, COR '18, was voted North Carolina Honor Veterinarian of the Year during the recent convention of his state veterinary association. He holds the position of professor of dairy husbandry of the North Carolina State College.

Dr. C. D. Grinnells

The award, a handsome plaque, was presented Doctor Grinnells in recognition of outstanding service to the veterinary profession and to the Livestock industry of North Carolina.

Keep Teat OPEN — Keep It MILKING

To maintain unrestricted milk flow and provide antiseptic protection is of first importance in the care of Injured teats, Scab teats, Stenosis, and in post operative therapy. Dr. Naylor Medicated Teat Dilators are SULFA-impregnated surgical dressings for the teat canal.

They act both medically and mechanically to provide prolonged broad spectrum germicidal activity and gentle non-irritating support to traumatized sphincter and teat mucosa. They promote normal tissue repair with a minimum of altered milking function of the streak canal. Positive retention — fit large or small teats.

WITH ANTIBIOTICS

The soft, highly absorbent properties of Dr. Naylor Dilators make them an ideal vehicle for additional local medication of your choice. To obtain the synergistic bactericidal action of Antibiotics and Sulfathiazole following teat surgery, saturate with your favorite udder infusion antibiotic.

Dr. Naylor's

MEDICATED TEAT DILATORS

DISPENSING PACKAGES

Have you used BLU-KOTE for Cowpox*, Ringworm, Moist Lesions, Skin Abrasions? Blu-Kote dries oozing lesions, reduces pus formation, controls secondary infection* . . . Quick Drying . . .

BLU-KOTE contains Acriflavine and Gentian Violet in combination with fungicidal Sodium Propionate and cleansing, debriding Urea. Effective against both bacterial and fungus infections most common in skin lesions of large and small animals.

4 oz. bottle (dispensing label) Per Doz. $8.00.

H. W. NAYLOR CO., MORRIS, NEW YORK

PREVENT

Hog Cholera and Erysipelas quickly... safely...with

HOG CHOLERA VACCINE

Full modified virus, vacuum dried, porcine origin, when used with serum confers quick, positive immunity.

Erysin RL
ERYSIPELAS BACTERIN

Highly concentrated, formalin inactivated, aluminum hydroxide absorbed suspension of Erysipelothrix rhusiopathiae organisms and their soluble antigens. Safely prevents swine erysipelas!

These two products used simultaneously offer safety, efficiency and reliability in the prevention of Hog Cholera and Swine Erysipelas.

Sales to graduate veterinarians through Independent Ethical Distributors.

RESEARCH LABORATORIES, INC., Saint Joseph, Missouri

Preferred for
precision and
performance

BARD-PARKER
RIB-BACK
SURGICAL BLADES

BARD-PARKER RIB-BACK SURGICAL BLADES are preferred by the Profession . . . because they know that each blade, through continuous inspection—meets every specification.

And, there are other traditionally good reasons why there is a preference for B-P RIB-BACK SURGICAL BLADES . . . they are *always* dependable and highly economical in performance.

Ask your dealer
BARD-PARKER COMPANY, INC.
Danbury Connecticut, U.S.A.

MEETING CALENDAR

Pennsylvania State University. Annual Health Conference. State College, Pa., August 21, 1956. Dr. Ernest J. Witte, Chief, Division of Veterinary Public Health, Harrisburg, Pa.

Louisiana Veterinary Medical Association. Regular meeting. Jung Hotel, New Orleans, La., Aug. 30-31, 1956. William H. Lockard, Jr., secretary.

Pennsylvania State Veterinary Medical Association. Annual meeting. Bedford Springs Hotel, Bedford, Pa., September 12-14, 1956. Raymond C. Snyder, N.W. Corner Walnuts St. and Copley Rd., Upper Darby, Pa., secretary.

Northeast Mississippi Veterinary Medical Association. Annual Clinic with Dr. W. L. Stroup. Stroup Animal Clinic. Corinth, Miss. Tuesday, Sept. 12, 1956. James H. Nelson, Box 372, Baldwyn, secretary.

Washington State Veterinary Medical Association. Annual meeting. Davenport Hotel, Spokane, Sept. 21-22, 1956. P. J. Pfarr, 6306 N. Wall, St. Spokane, general chairman.

Oklahoma Conference for Veterinarians. School of Veterinary Medicine, Oklahoma A & M College, Stillwater, September 27-28, 1956. A. L. Malle, Department of Veterinary Pathology, chairman.

Eastern Iowa Veterinary Association. Annual meeting. Hotel Montrose, Cedar Rapids, Ia., October 4-5, 1956. Forrest B. Brutsman, Traer, secretary.

University of Missouri. Thirty-second annual Short Course for graduate veterinarians. Columbia, Mo., Oct. 1-2, 1956. Dr. Cecil Elder, chairman.

Purdue University. Forty-fourth Annual Short Course for Veterinarians. Purdue University, Lafayette, Ind., Oct. 3-5, 1956. L. M. Hutchings, chairman.

South Dakota Veterinary Medical Association. Annual meeting. Hotel Cataract, Sioux Falls, S. Dak., Oct. 4-5, 1956. Dr. J. L. Noordsy, Marion, S. Dak., secretary.

University of Illinois. Thirty-seventh annual Conference and Extension Short Course for Veterinarians. University of Illinois, Urbana, Ill., October 12, 1956. L. E. Boley, University of Illinois, College of Veterinary Medicine, chairman.

American Veterinary Medical Association. Annual meeting. Municipal Auditorium, San Antonio, Tex., October 15-18, 1956. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago, Ill., executive secretary.

Southern Veterinary Medical Association will hold their 1956 Annual meeting in conjunction with the American Veterinary Medical Association convention at San Antonio, Texas, Oct. 14-18, 1956. Dr. A. A. Husman, Raleigh, N. C., secretary.

Sixth annual veterinary symposium on The Newer Knowledge About Dogs. Kankakee, Illinois Civic Auditorium, October 24, 1956. Dr. Robert Graham, Universit yof Illinois School of Veterinary Medicine, chairman.

United States Livestock Sanitary Association, 60th annual convention, Hotel Morrison, Chicago, Ill., Nov. 28-30, 1956. Dr. R. A. Hendershott, 33 Oak Lane, Trenton 8, N. J., secretary.

NEW vitamin-mineral supplement for all species

NUTRI-MIX

Now stock one vitamin-mineral supplement whether your next patients are large or small animals or poultry. NUTRI-MIX is especially formulated as a dietary supplement for all species.

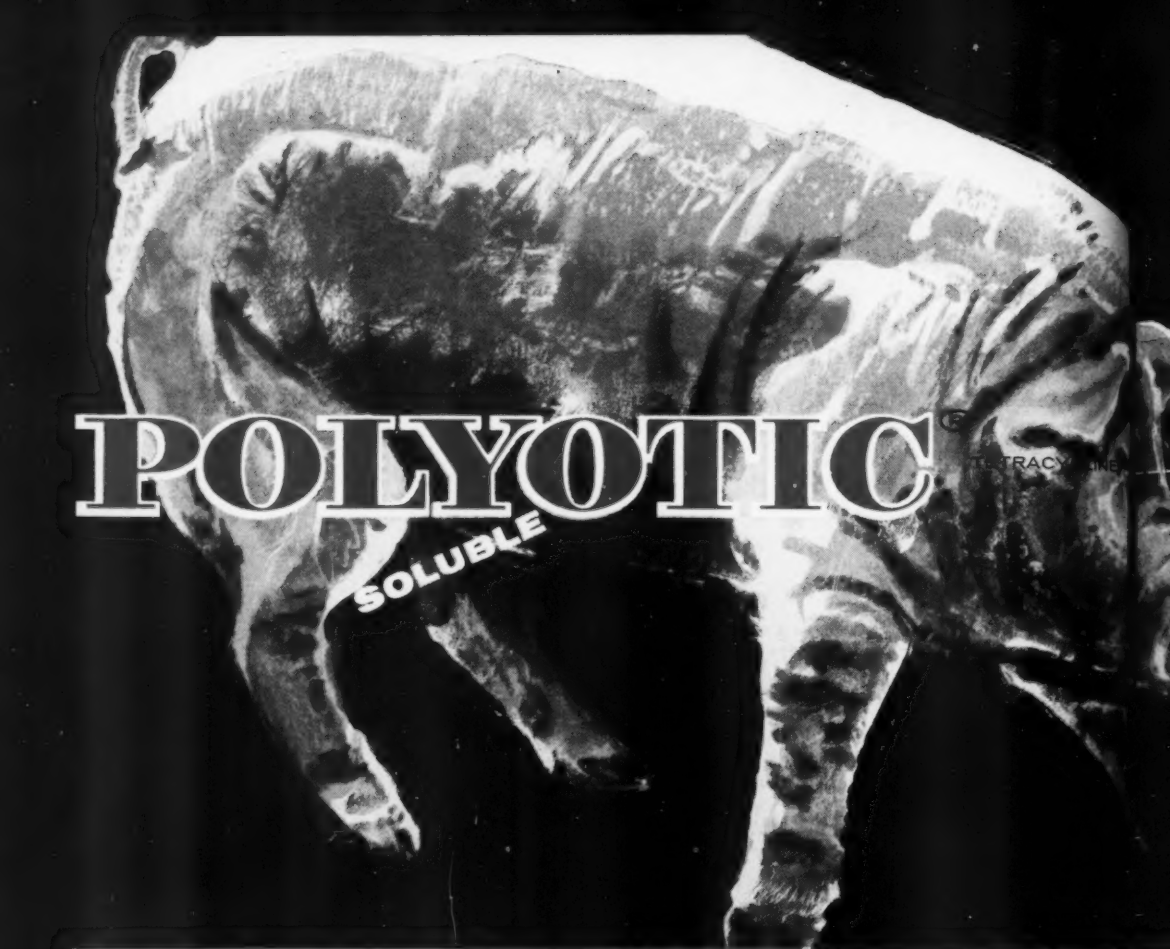
SPECIAL 4 oz. pack and label directions for Dogs and Cats. All large animal references omitted

- Provides 20 vitamins and minerals in optimum nutritional levels.
- Vitamins are stable—"A" factor is gelatin-coated and "D" factors are wax coated for high stability. Special anti-oxidizing additive helps maintain the stability of all vitamins.
- Contains protein bound organic iodine—unusually stable and more readily assimilable than potassium iodide.
- Acceptable taste—contains soybean oil, sucrose and powdered molasses for palatability.
- Indicated in correcting nutritional deficiency—also for supportive use in parasitism, post-operative cases, debilitation following illness, and in promoting general health and growth.
- Attractively packaged—4 oz. small animal size has special dispensing label.

Remember to include NUTRI-MIX in your next order

Supplied In: 12—4 oz. ..... $7.20; 1 lb. $2.25
12—1 lb. ..... $24.60; 25 lb. $47.50
100 lb. (4—25's) $180.00

Norden Laboratories — Norden® — Lincoln, Nebraska



AVAILABLE TO VETERINARIANS ONLY | LEDERLE PROFESSIONAL

Lederle LEDERLE LABORATORIES DIVISION AMERICAN CYANAMID COMPANY PEARL RIVER, NEW

FOR PIG AND CALF SCOURS

Your clients will like the easy-to-administer nature of this ideal dispensing item. You will like the consistent results obtained from the routine use of this newest of the broad-spectrum antibiotics, first introduced to the veterinary profession by Lederle.

Available in: 1/4-lb.; 1/2-lb.; 1 lb. and 5 lb. jars.

OLYOTIC INTRAMUSCULAR:
100 mg.-500 mg.-1.0 Gm.-5.0 Gm.
OLYOTIC INTRAVENOUS: 100 mg.-2.5 Gm.
OLYOTIC OBLETS®: 4's-6 x 4's
OLYOTIC CAPSULES: 50 mg., 25's-100's; 100 mg., 100's; 250 mg., 16's-100's
OLYOTIC TABLETS: 50 mg., 25's-100's; 100 mg., 25's-100's; 250 mg., 16's-100's
OLYOTIC MASTITIS OINTMENTS ¼ oz.
OLYOTIC COMPOUND MASTITIS OINTMENT: ¼ oz.
OLYOTIC OPHTHALMIC OINTMENT 1%: 6 x ⅛ oz.
OLYOTIC TOPICAL OINTMENT 3%: 1 oz.
OLYOTIC SOLUBLE (Tinted) POWDER:
¼ lb.-½ lb.-1 lb.-5 lb.
VIANIZED® RABIES VACCINE: (Canine):
1 dose-5 x 1 dose-10 doses
VIANIZED RABIES VACCINE: (Cattle): 10 doses

AVIANIZED CANINE DISTEMPER VACCINE:
1 dose-10 x 1 dose
ANTI-CANINE DISTEMPER SERUM AND ANTI-INFECTIOUS CANINE HEPATITIS SERUM: 20 cc., 100 cc.
INFECTIOUS CANINE HEPATITIS VACCINE: 2 cc.-10 cc.
BRUCELLA ABORTUS VACCINE: 1 dose-5 x 1 dose-5 doses (25 cc.)
FELINE DISTEMPER VACCINE: 1 immunization (2 vials Vaccine, 2 vials Sterile Diluent, 2 cc.)
ANTI-FELINE DISTEMPER SERUM: 50 cc.
CARICIDE® Diethylcarbamazine TABLETS:
400 mg., 25's
DIETHYLSTILBESTROL SOLUTION: 10 cc.-50 cc.
LEPTOSPIRA CANICOLA-ICTEROHEMORRHAGIAE BACTERIN
Whole Culture Inactivated Vacuum-Dried
Other products to be added.

THE
URĒMI-LAB

ORDER ONE—
USE IT OFTEN—
FOR ON-THE-SCENE BLOOD UREA ESTIMATES

Simple, rapid blood urea tests when you need them. A handy aid to diagnosis.
$6.00 by mail, or see your dealer.

ELLFIELD LABORATORIES, Riverdale, Md.

—DEATHS OF VETERINARIANS—

Harley E. Ash, Bowling Green, Ohio, ONT '15, April 2, 1956.

George E. Bamberger, Reno, Nev., CVC '09, May 6, 1956.

Roy W. Bowerman, Oklahoma City, Okla., KCV '11, May 13, 1956.

Benjamin W. Boyd, Laredo, Texas, KCV '07, June 8, 1956.

Gerald W. Cady, Mason City, Iowa, ISC '21, April 11, 1956.

William Caslick, Paris, Ky., COR '27, June 3, 1956.

J. W. Carlton, Moultrie, Ga., GA '33, Jan. 17, 1956.

Ennis A. Davis, Columbus, Ga., API '22, May 29, 1956.

Robert J. Dunleavey, Syracuse, N. Y., GWU '10, May 2, 1956.

Milton R. Evans, Long Beach, Calif., OSU '39, April 12, 1956.

M. P. Freed, Conneaut, Ohio, OVC '96, Feb. 29, 1956.

Thomas P. Gallahue, Waukegan, Ill., CVC '17, Feb. 25, 1956.

Albert G. Griesbach, Loveland, Colo., CIN '16, March 28, 1956.

William H. Haskell, Jacksonville, Fla., UP '12, May 22, 1956.

Joseph L. Hearn, Texarkana, Texas, KCV '08, Jan. 12, 1956.

Arden L. Hirleman, Savannah, Ga., CIN '02, April 2, 1956.

George N. Jull, Loudon, Ont., ONT '16, Feb. 29, 1956.

Donald T. Kemp, Detroit, Mich., ONT '10, Feb. 29, 1956.

Harvey A. Knoche, Adrian, Minn., MCK '11, April 10, 1956.

Cacig B. Mampreian, Chicago, Ill., UP '16, March 4, 1956.

Maj. John H. McGilvray, V.C., U.S.A., Denver, Colo., ISC '42, June 30, 1956.

Clarence C. Merriman, Los Angeles, Calif., KSC '34, March 27, 1956.

Ahijah J. Munn, Fayette, Mo., KCV '04, June 30, 1956.

Edward C. Nash, Aracdia, Wis., MCK '18, Jan. 31, 1956.

J. H. Odgers, Maquoketa, Ia., CVC '14, June 3, 1956.

William H. Pflaeging, Douglas, Wyo., KCV '10, Feb. 6, 1956.

Guy Phelps, Sr., Montgomery, Ala., API '11, March 24, 1956.

Leon L. Powell, Yantley, Ala., API '17, Feb. 8, 1956.

INDEX TO ADVERTISERS
In This Issue of Veterinary Medicine

While every care is exercised in the preparation of this index to assure accuracy, the publishers cannot guarantee against the possibility of errors or omissions.

Aeroplast Corporation XXIV
Affiliated Laboratories XXII
Armour Veterinary Laboratories XLVI
Arnold Laboratories XLV
Ashe Lockhart, Inc. ..... XXVIII-LV

Bard-Parker L
Babson Brothers Company XV

Carter-Luff XXXV
Chatham Pharmaceuticals, Inc. XLIV
Chicago Pharmacal Company XIV
Coast Fisheries XXX
Corn States Laboratories ..... Fourth Cover
Curts Laboratories XXXVIII

Dalare Associates XXXII
Detroit Veterinary Supply XXXII
Diamond Laboratories LIV

Ellfield Laboratories LIV

Fay's Professional Products Company XLVIII
Fort Dodge Laboratories ..... IV-XXV
Fromm Laboratories XXIX

Gaines Foods Company XXXVII
Grain Belt Supply XXXIII

Haver-Glover Laboratories LVI

International Salt Company XX

Jensen-Salsbery Laboratories ..... Second Cover

Kirschner Manufacturing Company XXXVI

Lederle Laboratories ..... LII-LIII
Livestock Chemical Company XXXV

Mason Fence Company XXXIII
Massengill, S. E., Co. XLVII
Meyer, Theo., Estate XL
Motorola Communications and Electronics, Inc. XXXI

Naylor, H. W. XLVIII
Norden Laboratories LI
Nutritional Minerals XLV

Oster, John, Manufacturing Co. XXXVIII

Parke, Davis and Company III
Parlam Corporation XIII
Pedrick Laboratories XXXV
Pfizer, Chas., and Company ..... XXI-XXXIX-XLI
Pitman-Moore Company ..... XXIII-XXVI

Ralston Purina Mills XLII
Research Laboratories XLIX

Schering Corporation ..... IX-X-XI-XII
Sharp and Dohme V
Silent Partners Associates XXXIV
Squibb, E. R., and Sons ..... XVIII-XIX
Sterling Research XL

Upjohn Company, The VI

Veterinary Diagnostic Laboratories XXXVI
Vitamineral Products XVII

Winthrop Laboratories ..... Third Cover

The firms listed can serve your requirements for products and equipment they manufacture and distribute. Please mention VETERINARY MEDICINE *when you write advertisers; it will identify you.*

Lockhart announces

With the addition of Alva, Lockhart offers the graduate veterinarian a complete choice of biologics for the control of erysipelas.

Alva is produced from an antigenic strain of Erysipelothrix rhusipathiae which has been thoroughly tested for its avirulence. It provides a safe durable immunity with a live culture vaccine. Alva is available to veterinarians only.

Alva offers these 5 advantages:

- **Effective and economical**
- **Avirulent for safety**
- **Use with or without serum, on all or part of the drove.**
- **Live culture for high antigenic response.**
- **Desiccated for maximum potency . . . vacuum stoppered for greater stability.**

Alva is administered subcutaneously in 2 cc doses. Exposed or infected swine may be given anti-swine erysipelas serum simultaneously. Swine held beyond normal market period, or breeding stock, should be revaccinated.

"Better Biologics for the Graduate Veterinarian"

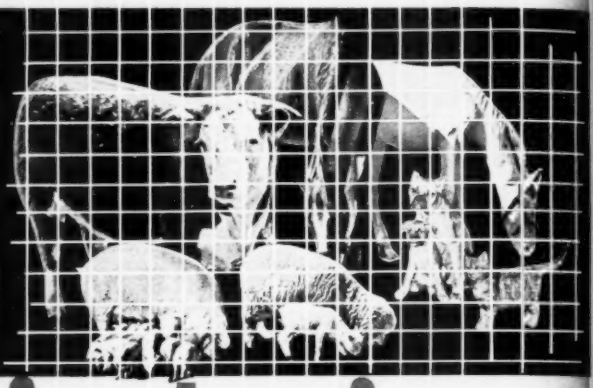
LOCKHART

*Trademark

ASHE LOCKHART, INC.
800 WOODSWETHER ROAD KANSAS CITY 6, MISSOURI

A safe, dependable barrier protecting animals from histaminic actions . . . .

Pulmonary edema
Laminitis
Photosensitization
Anaphylaxis
Urticaria
Tympanites
Bovine stomatitis
Overloaded rumen
Toxic indigestion
Milk fever
(central nervous stimulation only)
White scours in calves
(after acute stage)



Antiphrine

Antiphrine provides a wide spectrum of efficacy for the symptomatic relief of many forms of allergies and related conditions. There are no undesirable side effects with Antiphrine. Antiphrine contains *Pyrilamine Maleate,* which is one of the most effective antihistamines, while *Ephedrine* is added to enhance and prolong its action.

Antiphrine may be given orally or parenterally. The solution can be injected for immediate action, while the tablets, Hextabs or Toytabs indicated for maintainance therapy. Antiphrine is excellent for dispensing.

HAVER-GLOVER *Laboratories* INCORPORATED

DEPENDABLE, NON-GRIPING–

PURGATIVE

FOR ALL

DOMESTIC ANIMALS

UNIFORM CHEMICAL COMPOUND,
ISTIZIN IS RECOMMENDED
BECAUSE IT IS:

- Effective
- Stable
- Non-griping
- Well tolerated
- Odorless
- Tasteless
- Economical
- Easy to administer

Supplied in bottles of 1 pound and 5 pounds of powder and in ½ oz. boluses, boxes of 24.

Literature supplied on request.

ISTIZIN®

Winthrop LABORATORIES
NEW YORK 18, N. Y.

Istizin, trademark reg. U. S. Pat. Off., brand of DANTHRON (dihydroxy-anthraquinone) — with 5% charcoal

Corn States

Antibiotics

Procaine Penicillin G in Aqueous Suspension
Procaine Penicillin G in Oil
Dihydrostreptomycin Sulfate Solution
Antibiotic Combination 1
Antibiotic Combination 2
Antibiotic Combination 3

SOLD EXCLUSIVELY TO GRADUATE VETERINARIANS

Corn States
LABORATORIES, INC.